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THE LIGHTER BRANCHES
OF AGRICULTURE



BY

• EDITH • BRADLEY •

• & •

• BERTHA • LA • MOTHE •

• WITH AN INTRODUCTION •

BY
THE

• COUNTESS • OF • WARWICK •



EDITED BY ETHEL M. McKENNA



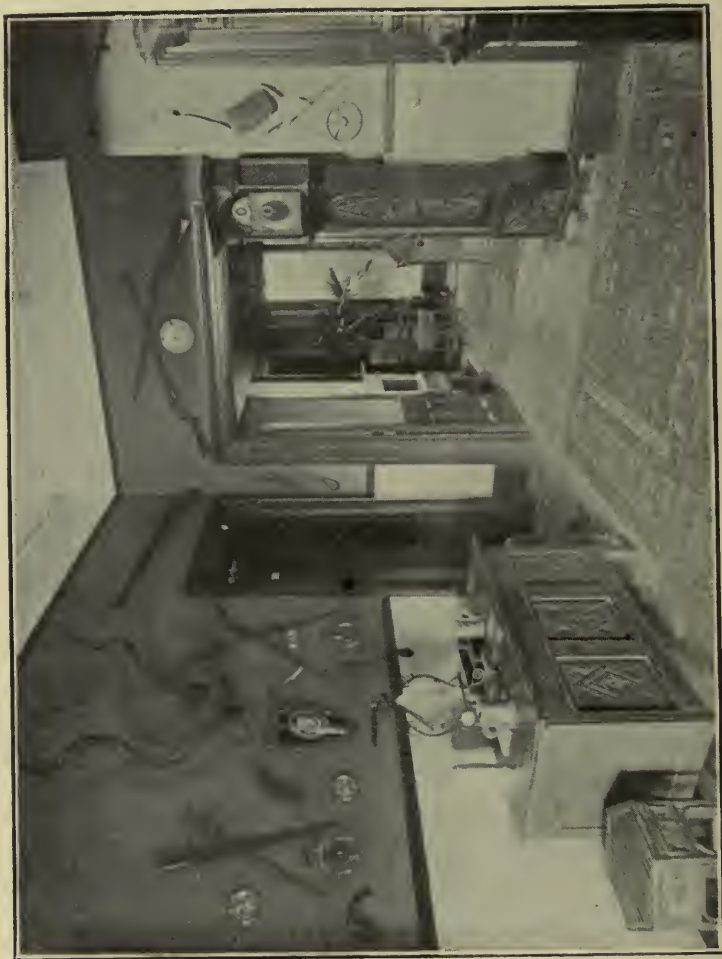
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IN SIX VOLUMES

VOLUME VI

LIGHTER BRANCHES OF
AGRICULTURE



Lady Warwick Hostel—The Entrance Hall

Frontispiece

Wom.

The Woman's Library

VOL. VI

THE LIGHTER BRANCHES OF AGRICULTURE

BY

EDITH BRADLEY

WARDEN OF LADY WARWICK COLLEGE, STUDLEY CASTLE
WARWICKSHIRE

AND

BERTHA LA MOTHE, N.D.D.

WITH AN INTRODUCTION BY


THE COUNTESS OF WARWICK

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INTRODUCTION

BY LADY WARWICK

THE Lighter Branches of Agriculture is a convenient expression which has been used to denote that field of labour in agriculture which is more specially the province of women than of men. Readers of Mr Hardy's novels know, of course, that much of the rough work of the farms is often done by women, even in this country. Tess was not only a dairymaid: she had also to dig and hoe, and bind the sheaves after the reaper. But the rougher work is after all done by the men in England.

The greyer skies of the north seem to temper the despotism of man, and the farm-labourer's wife is not the beast of burden in this country, that she so often becomes abroad. Indeed her daughters nearly always

go into domestic service, thereby adding to the great stream of emigration to the towns. However, work is always open to these girls, and it is not of them that I am specially thinking. There is another class of women who are at present at a discount, as typewriters, and governesses, and clerks. Nobody can pretend that the women who follow these vocations are adequately paid. We salve our consciences by talking about the market rate, and the laws of supply and demand. I admit at once that there is no use in wasting sentiment on the hardships that these laws impose upon any section of the community. We must be up and doing to find channels of employment where the pressure is not so great.

It seems to me that light work upon the land offers one solution of this problem by opening the gates of our crowded cities to a healthier and happier life. That is why I welcome this present volume which set forth how this lot may be won.

Now I must explain what I mean by the Lighter Branches of Agriculture. It implies all work on the land which requires skill rather than mere physical strength. It embraces work in the dairy, work in the garden and greenhouse; supervision of market gardens, culture of fruits, management of poultry and bees. As a necessary part of this work, the worker must know how to market her produce, make her fruit into jam, and preserve the vegetables that do not find an immediate sale. I think I have said enough to show that the lighter side of agriculture requires something more than a light heart and nimble fingers. I cannot insist too much on the fact that it demands a thorough training, a wholehearted service, and a determination to overcome obstacles. Agriculture even in its lightest mood offers no chance of success to the dilettante, but the woman who takes it up as a means of livelihood must have a sound training in some agricultural hostel or

college. . . . She must be prepared to go in as a worker with no class prejudice, and to put her hand to anything which comes first. She must be able to do without servants, to sweep her own floor, and cook her own meals. It must be remembered that the lady who takes up this work has to overcome the prejudices of the farmer and gardener, who are very necessary allies. She can do this best by showing them that being an educated woman does not make her any less fitted for a trade.

I admit at once that the great difficulty is the expense of the training. I fear that in some cases it is insuperable, and it is the strongest argument for the establishment of a Woman's College with a good endowment, sufficient to supply scholarships for those who need them. Where this endowment is to come from I have no idea. The State will perhaps some day see the wisdom of subsidising this college. Meanwhile if the cost of the college is too great, the student

can perhaps gain some practical experience for her work on a farm, where she would be allowed to take part in the daily routine of the dairy and domestic work. There are also day-classes at some of the colleges, which may be attended by those who cannot afford the boarding terms. I think the matter so important that I would go so far as to advise a woman to spend what little capital she has upon the necessary training. Remember also that physical strength is absolutely necessary in addition to the small sum of money required for the training.

I should estimate this sum at a minimum of £160, and should add that at least a year must be spent in learning the work. But three years is hardly more than sufficient. Having acquired her training, the student will be well advised to start earning her livelihood by taking a post as a gardener, or as an assistant on a poultry-farm or dairy. She will thus be able to test her capacity for work, before setting up on her own account.

But to obtain even a minor post, certificates and diplomas are nearly always necessary, and that is why I have laid such stress on the *training*. There is no question, however, as to the demand for women to fill these posts.

This demand is at present greater than the supply, and in the short time that the movement has been started, thirty or forty posts have, to my own knowledge, been obtained by the students of one college alone.

The average salary for this work is thirty or forty pounds a year, with board and lodging. It includes appointments as gardeners, and assistant gardeners, in country houses, and work upon dairy and poultry farms. These appointments are only stepping-stones to a greater object, which is to enable women to set up for themselves upon the land. I know of some who have already succeeded in doing this; but at present they are few and far between. What I look forward to is the establishment of women's

agricultural settlements in the neighbourhood of manufacturing towns and watering-places. I think that such settlements might do a flourishing trade in butter, milk and eggs, in vegetables, poultry, fruit, and flowers. I believe that they should be run upon co-operative lines.

I am sure also that there is a great opening for "petite culture" in country districts in England. The greatest hope of success in these ventures lies in combination. A number of women might do well where one would fail. The chief obstacle to the success of working allotments is the cost of freight. The greatest hope of meeting the railway companies is to send large instead of small parcels of produce, which is another argument for working in combination. Some day perhaps such settlements may be able to charter their own motor vans, and thus remove the main obstacle to farming on a small scale in England.

It seems to me that cultured and educated

women might turn their attention to this problem with advantage to themselves and the country. A high-school girl would master the necessary work very easily, and might find a larger and more varied existence in this way than in swelling the ranks of the underpaid professions, and I think it important that the student should be caught young.

I look forward to the time when there will be a number of these settlements working on co-operative lines dotted all over England. I believe also that they will incidentally be doing a great work to stem the tide of emigration into the towns; for such settlements will not only give employment to the villagers, but will also raise the standard of agriculture through the breadth of the land, and thus help to create that small peasant-proprietorship which I sometimes think will be the salvation of rural England.

FRANCES EVELYN WARWICK.

WARWICK CASTLE.

MARKET GARDENING & FRUIT
FARMING AN OCCUPATION
FOR WOMEN

CHAPTER I

MARKET GARDENING AND FRUIT FARMING AN OCCUPATION FOR WOMEN

THE last twenty years have seen the most extraordinary changes in the status of women. An Introductory Sketch
They have become "emancipated" doubtless, although in a somewhat different direction from the "emancipation" originally contemplated by those Pioneer Women of the eighties, who were for laying the axe at the root of the tree of the whole Social Fabric. From being man's "chattel," the more advanced of the sisterhood became his enemy, his pronounced enemy, and hurled anathemas of every description against his meanness, his gross selfishness, his cruel injustice, which could legislate so unequally for the sins of the woman and the sins of

the man. And yet as the Pioneer Woman, finding herself gifted with great powers of oratory, stood on the public platform and denounced man's weaknesses, she dressed herself as nearly as she dared in clothes similar to those worn by "mere man." So ironically true is it that "imitation is the sincerest form of flattery." And those who were quietly watching this movement observed many things, and reasoned on logical lines that when the somewhat violent leaders should have exhausted their energies, a reaction would inevitably take place, and that the extent of this reaction would greatly depend upon the co-operation and courage of the later recruits in the army of Woman's Progress. They wondered whether the leaders had been sufficiently far sighted to drill and inspire their followers with the truth and strength of their Cause, which would justify them attempting to climb the mountains of stern necessity and self-sacrifice as a compact body? Or would it not be

here and there a noble few who would try and probably fail, but by their failure make it easy for others to march to victory?

Human Nature is the same all the world over, and the history of the Woman's Movement is the history of every other progressive movement. The leaders go forward and make tracks in the dark wood for themselves, but they do not see that the tracks are not wide enough or smooth enough for the rank and file of their followers, unsustained by their own high aims and lofty ideals; therefore these lag behind, making sure of a safe path by which they can either return or else traverse with a certain amount of ease and comfort. Distressing as their slowness may be to the ardent spirits in front, their mode of procedure is useful and sustaining to the general Cause, because average everyday people do not care to be whirled off their feet by the glamour of a great enterprise. They prefer to sit down quietly (on an eminence per-

chance !) and say, "Now whither is this leading me, and am I to get anything out of it?" in other words, "Will it pay?" All honour to these useful people; they become the backbone of the whole scheme, and help to lay the dust raised by the clatter and hurry of the advanced guard.

Now, one cloud of dust raised by the "Pioneer Women of the Eighties" was a huge one, and is even now still circulating. It was the question of openings for women. If women were to be independent beings—as so many then strongly advocated as an advantage, and as so many since have advocated as a necessity—it was quite clear that they must work for their living, and obtain what is now so well known as a "living wage." Only so could they become really independent, because in this twentieth century in which we find ourselves "money" is said "to rule the world," and there were evidences of it doing so in the last decade of the nineteenth if not before.

Confronted suddenly with this vital question women stood aghast, or at least some did. For what openings could they possibly be qualified? The education of the average woman made her a useless being, except to grace the circle of society in which she moved; and very restricted in circumference most of the circles were!

It is true that disastrous circumstances Teachers had forced many to become governesses to their own great dislike, and in some cases with even more disastrous results to their pupils; but of course the teaching profession in all grades has claimed for itself a large army of women since those early days, who have been trained systematically to their profession, and who have done honour to it.

Then many who were ready writers Secretarial thought they would like to become private work and clerks, secretaries, clerks, and in process of time typists and stenographers (as the Americans prefer to designate shorthand clerks). The

Post-Office opened its doors to women, and though the examinations were stiff, the work monotonous, and the hours fairly long, yet the assurance of a pension in middle age proved a great inducement to many to seek such a security from Government.

As a natural consequence the girls of the next generation found themselves in a much better position, that is to say the agitation had created a demand for *trained* workers, and with the demand came a supply of workers for the most part *untrained*, yet realising ever more and more acutely the necessity for training. So it came about that parents at last awoke to the fact, that if they would have their daughters to be wage-earners they ought to receive as good an education as their sons, and be properly trained for whatever work or profession they took up. Each year this necessity for training becomes more and more evident, because competition is now so keen that only the skilled workers can possibly excel.

Therefore, because training was necessary all sorts of classes were opened to give the necessary instruction in indoor or sedentary occupations, and hundreds of girls, many of them well-educated, found a livelihood as clerks, typists, secretaries, etc., not to mention the medical and nursing professions.

These having been exhausted to a large extent, a movement was set on foot some twelve years or so ago for women to learn gardening, and a women's branch was added to the Swanley Horticultural College. Many girls went there, and some are now successful gardeners, either on their own account or else in posts. In 1897, to commemorate the Diamond Jubilee, the Victorian Era Exhibition at Earl's Court was planned, and various society ladies consented to form themselves into a committee to manage the Women's Section, which was sub-divided into many branches of education, art and literature. Lady Warwick was chairman of the Education Section, and by her wish a

Conference
at Empress
Theatre

series of weekly conferences were arranged on matters educational, and an important three days' conference was held in the Empress Theatre. This was throughout remarkably well attended, but the greatest interest was taken in the subject which occupied the meeting on the last day, viz.: "Women and Agriculture." The following list of speakers and subjects spoken about will give an idea of the width of range:—

Agricultural Education for Women in Great Britain, Ireland, and the Colonies—Right Hon. H. Plunkett, M.P.

Agricultural Education for Women in Canada—Professor James Robertson.

Agriculture for Women in Ireland—Professor Teegan.

Agriculture for Women in Great Britain—Major Craigie.

Agriculture in New South Wales—Miss Windeyer.

Education for Women in Rural Districts—Mr H. Macan.

Irish Flower Farms—Mrs Orpin.

Horticulture for Women—Miss Hutchings.

This Congress was really the starting-point

of Lady Warwick's future great work for women in connection with agriculture, and it led to the founding of her Hostel in 1898, and to the Agricultural Association for Women a year later.

There are many reasons to induce women to take up Market Gardening and other Light Branches of Agriculture. First, because if they are fitted for it the life is a most healthy one, and improves their physical condition enormously. Second, it can be made a means of livelihood, and those who go in for it heartily under the present and future advantages to be offered in Small Holdings, may in time become possessors of their own homes and freehold properties. Third, they will help the country and add to the revenue by producing for home consumption those things which are now looked upon almost as necessaries of life, such as eggs, poultry, butter, cream, cheese, fresh fruit, vegetables, jam, bottled fruits, etc., etc.

Reasons why
women
should take
up outdoor
occupations

Furthermore, the advent of cultivated

enterprising women into country districts should be a great factor in helping rural and village industries, and generally in bringing life and interest back to the country, which perhaps again may help in some measure to stay the depopulation.

Are women
physically
fitted for
manual
labour?

It is certainly true that all women are by no means fitted for manual labour or for an outdoor life at all. For instance those girls whose minds are set upon University life and the obtaining of degrees simply see nothing but an endless vista of monotony in gardening, especially in watering, weeding and tidying, without which who can become a real gardener? or in walking round and round poultry runs, carrying pans or buckets of food. Of course it is really the same in any profession or business, there must always be a certain amount of drudgery, it only depends upon the spirit in which "the drudgery" is undertaken. Then again women of more years who have never taken any sort of physical exercise in their youth

are not likely to be able to bear the strain of manual labour. And what is the manual labour required? Well, it is not largely digging or anything quite so backaching, but it is strength to be able to be on one's feet all day (by no means a sinecure to a woman); to be constantly moving about from one place to another, generally carrying something, either in one's hands or arms, or on a barrow. Or there is the necessity for stooping for a long time at a stretch, planting out or sowing seeds. To be a successful gardener these things must be done, and to the average girl, who has had little regular occupation at home, especially anything which calls for standing, these things come hardly at first, but it is extraordinary how soon accustomed students become to the work if they have taken it up of their own free will, and how stimulating they find the numbers doing pretty much the same thing. Then as a set-off to this comes the greatly improved health, both in bodily strength and absence

Kind of strength required for gardening

of "nerves," that noxious weed of modern civilisation! Therefore the conclusion arrived at is that given the right stamp of woman for this work, they can with ordinary care and experience become quite capable of doing all the manual work necessary to become a successful gardener, assisted by a labourer to dig and cart and wheel heavy loads, and who can also do the actual stoking of greenhouses. Women of course can, and do, do this well enough, but experience shows that it is undesirable for them to take so much out of themselves physically, when their object is to make use of their training and education in order to bring their *intellects* to bear upon the work in hand instead of doing it by mere rule of thumb.

The stamp
of women
required for
this work

From the foregoing it will readily be seen that the woman who will make a real success of the "lighter branches of agriculture" is the one who possesses, *first of all*, an innate love of the country, and of country life and out-door pursuits; second, one whose educa-

tion has helped to increase this feeling, and further has brought out all her best, latent, moral, and physical side in games and sports. Schools such as Cheltenham Ladies' College, St Andrew's, Wycombe Abbey, Bedale's, many belonging to the Girls' Public Day School Company, the Church Schools Company, and others, whose aim is to teach girls on natural lines to take their natural places in the world, in contrast to those which make accomplishments and "fine-ladyism" the all-important end of education, and then find that the girls thus turned out are chiefly "prigs" of the most miserable description, viewing with contempt those beneath them in worldly position; from these latter schools, I say, women gardeners and farmers are not likely to be drawn, but from the former—"yes," in a fair proportion. The pioneers of this work must be hardy and brave, and full of purpose and determination not to "look back," not to give up when the difficulties inherent to the novelty of this work for

educated women become very great. They must "live for posterity," and with their own lives and by their own work make it possible for their successors to build straight away on their foundations, and not be obliged to dig new ones. This ideal presupposes a band of women of high purpose and strong aims, and indeed they are required; therefore let the average girl, who *thinks* she is fond of a country life, sit down thoughtfully and count the cost of the step she is undertaking. It is of no use to obtain the money for her training—which in some cases is a matter of considerable difficulty—and then half way through, or even at the end, throw it all up, and take to nursing, or cooking, or something else equally remote from her original aim.

The higher
branches as
a "forlorn
hope"

In the early days of the movement, women who had failed at everything else, seemed to think that a very definite chance of success was now open to them. Elderly ladies, who had brought up families, tried a Short Course

of Instruction at the Hostel; elderly companions of spinster ladies and others thought they were eminently qualified to dig and to hoe, as well as other women equally unsuitable; but in the process of time these have been eliminated, and now the qualifications possessed by the prospective student are clearly defined and set forth.

When the girl, or woman, has quite *definitely decided* that she wishes to become a gardener, and later on to take up a special branch, which is likely, under given conditions, to offer the best chance of an income, she will naturally seek to enter one of the two institutions where women can be systematically trained for this purpose. I allude, of course, to the Lady Warwick Hostel, Reading, and the Swanley Horticultural College. There was a difference in the fees — £65 covering board, residence, and instruction at the former for cubicle accommodation, whilst at the latter £80 is

The training
required

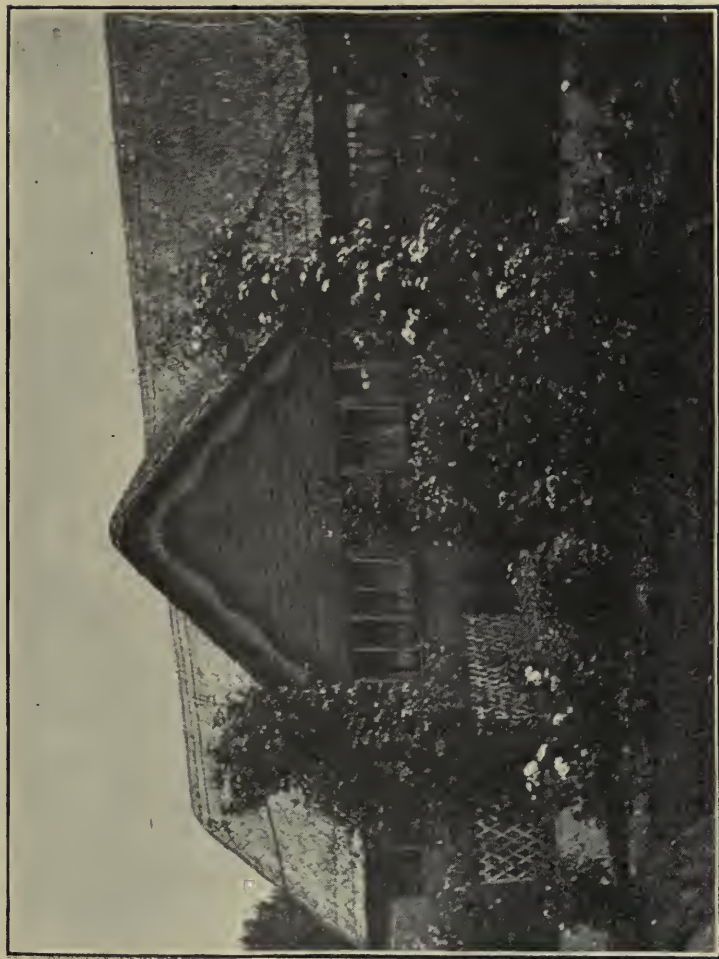
asked.¹ It is well, therefore, to calculate that the actual cost of training for the minimum time—two years—will amount to, exclusive of dress and holiday expenses, £170 to £180; that is to say, something under £200, which, indeed, is not a large sum to put a woman into the way of earning her own livelihood. Somewhat less than half, or even a quarter, which many boys have allowed them without demur!

The student should, moreover, have a definite prospect of at least another £200, as capital, to put her hand on when she is ready to start for herself. If by any means a larger sum can be procured, so much the better by all means; but with this subject I shall deal at length in a succeeding chapter on Women's Settlements.

Intermediate
posts

It is usual after two years' instruction for a student to go into a post as assistant-gardener,

¹ As, however, it has been found that £65 is not sufficient to compensate in any way for the large outlay entailed, the fees at Lady Warwick Hostel have now been raised to £80.



Lady Warwick Hostel—The Potting Shed

or companion-gardener in a country house kept by a widow or maiden lady, who is glad to have an educated woman about her place instead of the ordinary jobbing gardener, who is inclined to be very despotic over the grounds entrusted to his care, and who often shows a wonderful faculty for relieving his mistress of much produce described by him as "surplus" just to salve his conscience. Of course there are many difficulties in the way of posts which have to be smoothed out before they will be either easy or popular. To begin with, ladies wishing to engage women gardeners have the vaguest ideas as to what class they come from, and therefore how they ought to be and expect to be treated. The following examples will explain my meaning. A lady of position wished to have a lady as dairy maid, who could also do the table decorations, give finishing touches to the rooms previous to any entertainment, write invitations and letters for her employer, and (curious irony)

take her meals with the butler and ladies' maids!! The pampered menials of large establishments must be such a suitable and delightful class for a gentlewoman to associate with! of course they would feel it their peculiar mission to make such "an inter-loper's (?)" place as unpleasant as possible. And the salary (or why not call it wages straight away?) something between a first footman and a successful lady's maid.

Take another instance, this time in France. The lady gardener was to have the care of the greenhouses and do table decorations, but inasmuch as these occupations would not fill up the stated hours, namely, 7 A.M. to 7 P.M., she was to give the intervening ones to dusting the ivories and curios in the picture gallery, and doing cross-stitch or other needlework for her employer. Her meals she was to have alone, and to keep her own room entirely, making the bed, sweeping and dusting the furniture, as well as cleaning her own boots. There were to

be no hours off, even on Saturday afternoon, but on Sunday the lady might visit her friends or otherwise take a view of the big world outside from ten o'clock in the morning till seven at night.

On the other hand, I have in my mind Typical posts two others at least which represent quite a different side of the picture. The first where a clever and very keen young student was offered the post of head gardener, with a man and boy under her, in a large garden with glass. The lady herself, being deeply interested in her garden, gives her young head gardener much advice and help, to say nothing of the stimulation of a most observant mind. A nice little cottage in the grounds shelters the lady gardener and her belongings, and an old woman "does" for her. It is an excellent though a very responsible post, and seems likely to work out very well.

The second relates to two students who for over two years now have together taken the

entire management of the dairy and cheese-making on a large farm in Wales. They share a nice farm-house, keep a servant, and have their own pony and trap. They have certain hours off every day, which enables them to get a break in the daily round, and even to go visiting in the neighbourhood. Altogether they appear to be able to live comfortably and consistently with their tastes and respective positions in life, whilst at the same time giving every satisfaction to their employer, who knows that his interests are being looked after.

The students, on the other hand, have of course much to learn on their side; perhaps at first they erred by putting a fictitious value on their labour *because* they were women gardeners. Perhaps they thought—some were very young—that a glamour of sentiment about their work would cover many deficiencies, and it was hard to realise—and it takes many years to do so—that about work there must be no *sentiment*,



Lady Warwick Hostel—The Herbaceous Border

except the sentiment of *irreproachableness*. They realise better now that they are entering into competition with men, and by the market value of men's work their own will be valued, although some deductions may be made in their favour. Nevertheless it takes much conscientious work, many disappointments, many strenuous efforts, to prove to their employers that they are worth 25s. a week in wages, as against a labouring man's at 18s. or 20s. It may be inquired why should 25s. be asked as a woman's wage? Because it is agreed that the ordinary ^{Wages} necessary living cannot be reckoned at less than 10s. to 15s. a week if alone, and that rooms, fire, washing, etc., will take the balance of 10s. Of course it is really much better for two to share rooms and meals if in any way possible, but it is very seldom indeed that prospective employers venture on asking for more than one at a time.

I must crave the indulgence of my readers

if I have digressed too early into the regions of a student's prospects *after* training, instead of first discussing the question of training *per se*, but in view of the plan of this article as mapped out, it seemed an appropriate opportunity for dealing generally, if somewhat superficially, with the openings which offer themselves to the students.

The
necessity of
training

We have already agreed that training is necessary, in order to have any chance of success in the race for life ; it is the "trained capacity" that is so essential in all branches, coupled with an intelligent belief in co-operation and combination. If we take the average life of an average girl up to eighteen, nineteen, or twenty, what does she know of training, such as, for instance, any factory girl has learned? *She* knows what regular hours, regular work, regular pay means, and she knows also that unless she does her work properly she will be turned off, and that another and another are ready to fill the gap in the ranks which she leaves. Therefore,

from hard necessity she has learned that her work must be up to a certain *mechanical* standard at least, and then she will be all right. Of course if she chooses to put her heart and mind into it she will achieve a better result. Now the kind of girl we are discussing as a student has perhaps had a regular education, and done her lessons satisfactorily, but when she leaves school her day at home possibly consists in doing or not doing certain self-imposed tasks, in visiting or not visiting as her fancy dictates, and, in fact, after a conscientious performance of her few household duties, the question of filling up the time is the one problem in which she is seriously engaged.

When therefore such a girl thinks of taking up gardening as a profession, she has first of all to get herself into harness. She must go to a place where regular work or leisure is provided for every hour of the day. She must submit to rules of some kind, however light, because she then becomes a

member of a corporate body, and she must take upon herself the moral responsibility of doing the work which is set her, honourably and conscientiously, because she has become a responsible woman, and taken up the burden of life.

Satisfaction in
regular work

After a time the routine ceases to be irksome, and the regular hours leading to the accomplishment of satisfactory work gives a feeling of "purpose" and "achievement" which is immensely gratifying morally and mentally, to say nothing of a sort of exaltation of personal dignity in belonging to the great army of the employed, instead of to the greater one of the unemployed. Sometimes no doubt regrets for "the fleshpots of Egypt" will force themselves upon all healthy-minded girls, because the paths of dalliance and pleasure once left never again present the same attractions. Fulness of active life and work are apt to make a woman feel dreadfully "out of it" when she again joins in those social amusements which

used to seem so alluring ; besides a “working woman” is still viewed somewhat as a curiosity, another very annoying position in which to find oneself. On the other side, there is always the fear that in following manual occupations women are very apt to neglect the intellectual side, either from sheer fatigue or indifference, and this is a thing to be strenuously avoided, because a high standard of culture and manners should always be aimed at, otherwise there will be the fear of the whole movement resulting in deterioration. Nevertheless, the point which undoubtedly has to be faced by those who enter the ranks with the definite purpose of carrying the work through to its logical conclusion, is that like Cortez when he set out to conquer Mexico, the boats of the former irresponsible life *must* be burnt, so that there will be no return to the sunny lands of Spain until the conquest of the New World has been achieved. Then in her hands she can carry back the fruits of that conquest where-

What a woman must give up

with to build for herself, and better still for other women, not one boat, but a whole flotilla fitted up with the latest inventions and best equipments to sail the unknown seas of life in safety ; no longer in doubt of the issues, but feeling sure that steering by the compass of self-sacrifice (which is the law of life) they will in due course ride at anchor safely "in the haven where they would be." So with this, the warning of hard experience, let me urge every woman to sit down and count the cost before "she setteth out on this warfare."

What the
training
should
consist of

Now let us consider the kind of training itself which is required to fit a girl to become first of all a general gardener, and then to specialise as a market gardener. As to the essentials of which every one must possess a *practical* knowledge (and here let me pause and emphasise that the importance of *practical* knowledge cannot possibly be overstated, or the truth of the saying questioned that "an ounce of practice is worth a



Lady Warwick Hostel—Work in the Conservatory

pound of theory ”; women *must* be practical to succeed) let us take them in the following order :—

- I. (a) Digging. (b) Seed sowing. (c) Weeding. (d) Watering. (e) Care of lawns and garden walks. These apply to every branch.
- II. Fruit growing. (a) Walls. (b) Trees. (c) Pruning. (d) Gathering. (e) Storing.
- III. Flower growing for different purposes. (a) Ordinary bedding. (b) Herbaceous borders. (c) Rose gardens.
- IV. Shrubs and climbers.
- V. Work in greenhouses and under glass generally. (a) Potting. (b) Propagation. (c) Watering.

It would be out of place in the present volume to treat of these essentials and different branches of work from a purely technical point of view, but a few general remarks in detail, as it were from an on-

looker's side, may help to indicate the broad effects to be aimed at.

I. (a) *Digging*.—This is at best hard back-aching work for a woman, and a branch of gardening of which it is to be hoped she will not have a great deal to do. It is generally possible to hire a labourer, or what is known as “a rough man,” to do this, and it is certainly wiser to pay such wages as the locality demands for “spade labour” than for a woman to take an amount of energy out of herself which could be turned to far greater advantage in planning and scheming her work out with a clear bright brain. Of course every woman-gardener ought to know *how* to dig, and how to trench “two spits deep” too when necessary. In gardening as in everything else “knowledge is power,” and unless one has been through the mill oneself, how can one tell whether those working for one are doing the work properly? and in digging, as in all other kinds of work, if it is done badly or skimped, the next crops are

bound to suffer. The everlasting law of Cause and Effect is nowhere more quickly realised than in gardening.



“Planet Jr.” Double Wheel Hoes in a great field of Lily of the Valley, grown in Germany

Then, again, in England we are so ^{Labour saving} foolishly conservative that we do our best to ^{appliances} avoid benefiting in any way by the inventions of other people; therefore we will not

employ “labour-saving” appliances in our gardens and fruit farms, such as they have in America and Canada. It is true that some of these are on too large a scale for our fields with their narrow gates and picturesque

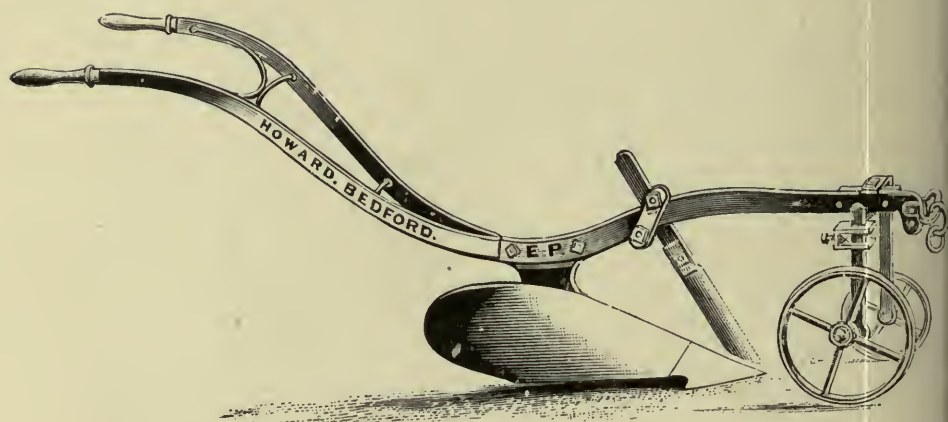


Fig. 1.—Howard's Allotment Plough

hedgerows, because the American machinery is built for long reaches of unbroken plains, where nothing impedes the progress of the machine; but with adaptation smaller appliances on the same principle ought to be invaluable in the present state of the labour market. For instance there are some

very useful small ploughs now on the market, called by various names, such as the pony plough, the allotment plough, or the small holdings plough, which are extremely useful on market gardens, as they can be drawn by a stout pony or

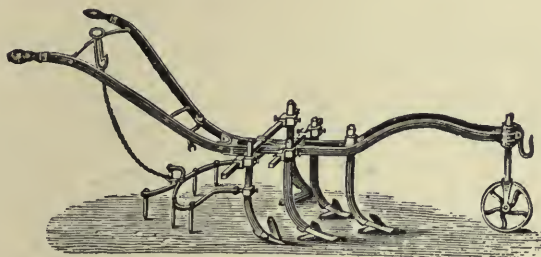


Fig. 2.—Horse Hoe

cob, and are quite powerful enough to break up the surface to a sufficient depth (three to six inches, and eight inches wide) after the crop is off. The one shown in the *illustration*, “Howard’s Original Allotment Plough,” only weighs 105 lbs., and costs £2, 5s.; it can be personally recommended from experience, though doubtless others are as good. Another invaluable implement is a horse hoe, of which Vipan and Headley’s has

been found most satisfactory as a hoe, not as a plough—see *illustration*.

Then there are most excellent American tools for use in a large garden, or on a market garden and fruit farm. I allude to the “Planet Junior Cultivators,” both for hand and pony work. It is not such a simple implement to use as its advocates would have one believe, but from actual experience I can affirm that it amply repays anyone who will set to work and thoroughly *learn* it, as a mechanic would *learn* to use his tools. Here let me say in parenthesis, that I have been struck over and over again at the extraordinary absence of anything like mechanical intuition in women; a course of workshop training would be invaluable to many taking up this new life, whether at home or in the colonies.

The Planet Junior Double Wheel Hoe, cultivator (fig. 4), rake and “plow,” can really be made to perform all the enumerated various operations by simply altering and adjusting the different tools for the purpose; as can also the

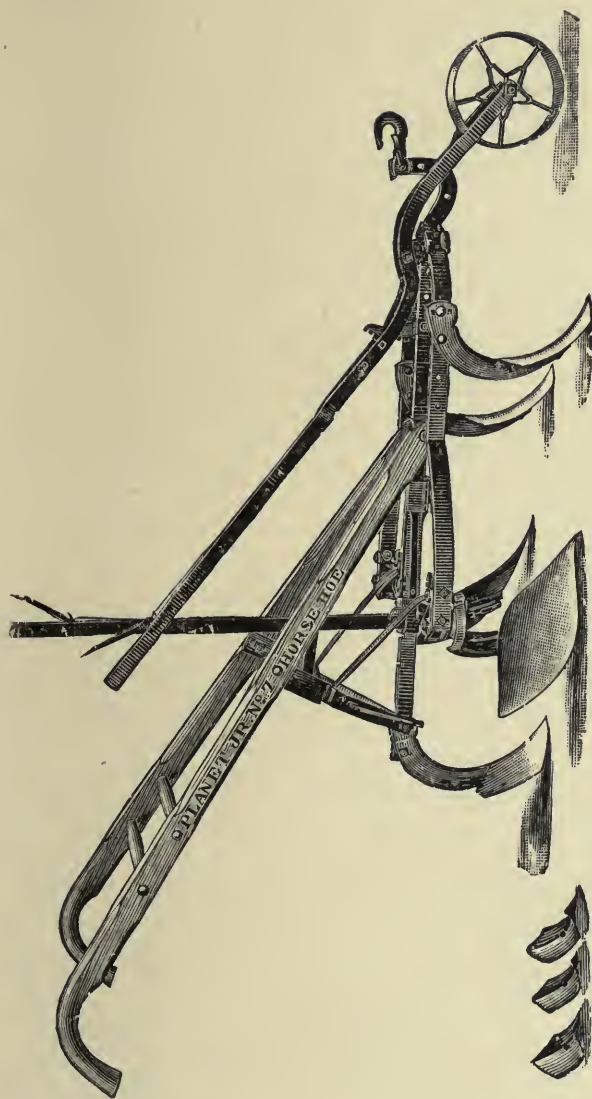


Fig. 3.—“Planet Jr.” No. 7 Horse Hoe and Cultivator

horse hoe and cultivator (fig. 3).¹ The great service performed by both tools is the constant stirring of the soil, which helps to keep down weeds, and to let air and moisture penetrate below the surface. It stands to reason that it must be a quicker and more thorough performance of the same than can possibly be done by a hand hoe. The cultivators save time and save labour, and are a good investment for capital to be laid out at starting, as they do not cost more than £2 to £3 each.

Seed sowing, weeding, watering, the care of lawns and walks (b, c, d, e) *Seed sowing, weeding, watering, the care of lawns and walks*—all these are so obviously essential to the well-being and well-doing of a garden, that the necessity for a thorough knowledge of all need not be dwelt upon. The homely proverb, “A stitch in time saves nine,” applies equally to a garden as to a garment. Lawns swept regularly once or twice a week, and cut as often as necessary,

¹ Mr Geo. Bunyard of Maidstone informed the writer that he kept ten Planet Junior Cultivators always at work on his fruit gardens, and he calculated that he saved £50 a year in wages for each cultivator employed.

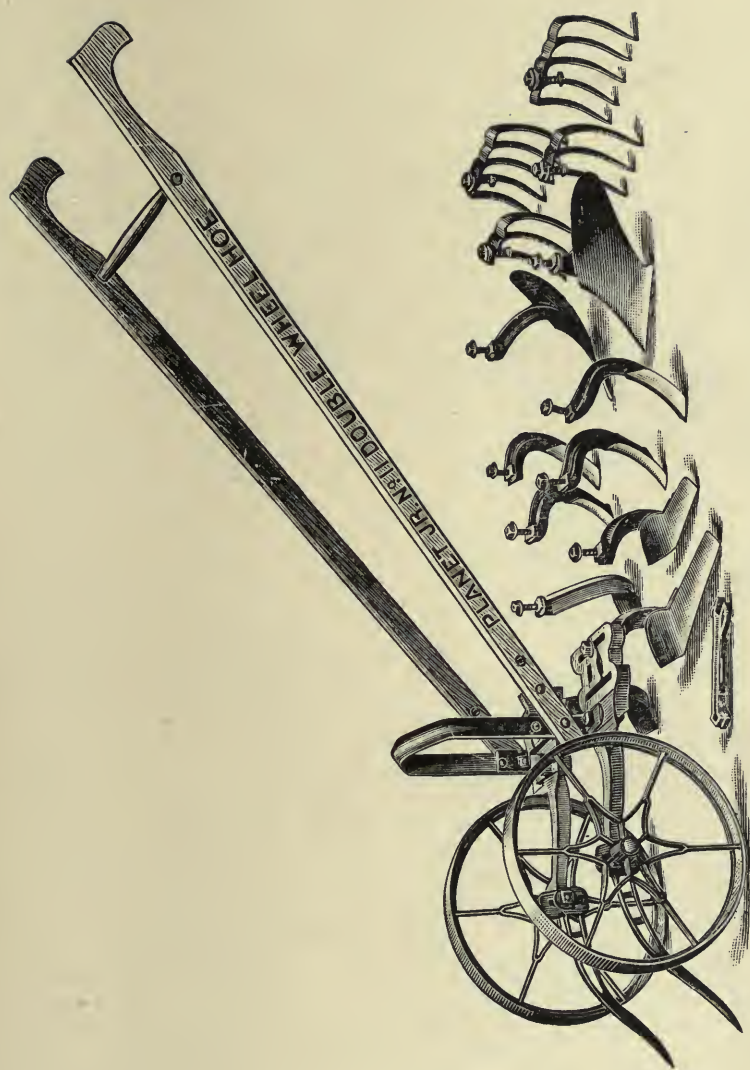


Fig. 4.—No. 11 Double Wheel Hoe, Cultivator, Rake and Plow

paths swept and weeded constantly, watering done regularly, all these form part of the

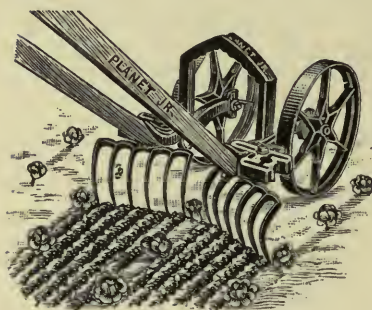


Fig. 5.—Hand Cultivator,
with Rakes

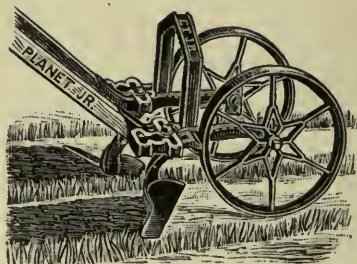


Fig. 6.—Hand Cultivator,
First Hoeing

everyday work of a gardener, which, if accomplished at the proper time, gives that

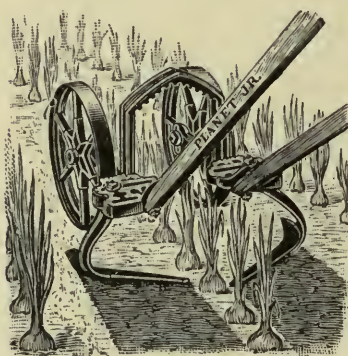


Fig. 7.—Hand Cultivator,
Late Hoeing

delightful appearance of human care and love, which can be seen at a glance in a garden, besides the saving of extra pressure and extra labour, which has to be substituted if the place

is allowed to get out of hand. Whilst on a market garden the steady eradica-

tion of weeds means that the crops are not robbed of their nourishment, and that they will pay fifty and a hundred per cent. better. Besides how monotonous life would become if there were no weeding to be done!

FRUIT GROWING

This is a most interesting subject. Eng-^{Fruit growing}land, especially Kent—the garden of England—has always been looked upon as a fruit-producing country, but it is only within our own time that such a tremendous impetus has been given to fruit growing on a thorough systematic basis. Of course the importation of corn from abroad, and the general cheapening of bread, has thrown whole corn-growing districts out of cultivation, but here steps in the fruit grower and *intensive* farmer. In the returns issued by the Board of Agriculture for 1902, the acreage of orchards has, since 1885, increased by 40,000 acres, and that of small fruits, since 1888-90, by 33,000

acres. We are essentially a fruit-eating nation, so much so, that the foreigner¹ finds a ready sale for the fruit he puts upon our markets by the ton, whilst often in seasons of glut ours is left to rot on the trees because it does not pay to gather and send it to the home markets, owing to heavy freight and Transport bad packing. The whole question of transport of our own agricultural produce is simply crying out for a solution. The present railway rates are prohibitive for any but the largest growers and capitalists, and it is not the rates only, but the shuntings and changes which cause great damage and loss. Mr Rider Haggard makes an excellent suggestion in his book, "Rural England," just out (Dec. 6th), which, if the Government in the person of the Postmaster-General could see their way to adopt *quickly* and *comprehensively*, might give such an impetus to the "Lighter Branches of Agriculture" that in another half century

¹ Between 1891 and 1901 over 45,000,000 bushels of apples were imported, chiefly from America.



Lady Warwick Hostel—"Edging Borders"

rural England might be glad and happy once more. I allude to an organised system of ^{An} Agricultural Post; this, to commence with, ^{Agricultural} ^{Post} might be looked upon as a glorified parcels post, which has been so very successful. It would seem, however, that much time and expense could be saved to the producer if the Post-Office vans could collect the produce daily, if not from door to door, at receiving offices in small areas, and that these offices should have scales for the public to use, and room to put things down, instead of the little crowded shops which so often now have to do duty for local Post-Offices. Of course the Government would have to pay more liberally than they do, but why not? The dignity of such a Department as the Post-Office might surely be maintained at a higher level than at present, especially in regard to the manners of the clerks and assistants! No doubt the outlay would be very heavy at first, but if this Agricultural Post indirectly led to the re-population of the rural districts, surely it

Motor Transport would be a hundred times worth while. Motor power will no doubt also play a very important part in the future of agriculture, whether as machines on the land or in the transit of produce.

Packing Lastly, there is the *most important* question of packing and grading. Statesmen, officials and others all agree, and constantly vociferate, that our people must learn to put their goods on the market, as well packed as by the foreigner, but anything like organised instruction in this dainty branch of work seems conspicuous by its absence. Surely the County Councils might give attention to this important matter, and organise *practical* not *theoretical* classes. Here surely women ought to make a great success with their deft fingers and light manipulation. In fact, they could very well become the instructors, although the County Councils would possibly have to import a Dane to teach them.

Careful selection of ground for a fruit farm The embryo fruit farmer must, before all things, make a very careful selection of her ground before planting an orchard. Broadly

speaking, all fruit trees want a good soil, and good depth of soil. Of course bad ground can be improved, but it is a great question whether it is worth spending time and money in so doing, because it is not only the great expense of manuring and cultivating which is never ending, but if the roots lack proper nourishment the trees will *not* grow or bear crops worth speaking of during the process of improvement. It is money out of pocket, capital invested which gives no return, and therefore *does not pay*, and a business woman must not meddle in things which do *not pay*, except for sentimental reasons. I do not mean that making money is to be the end sought for itself, far from it; a woman whose *ultima thule* is £ s. d. is to be avoided like a disease; but when after a fair trial it can be proved that this or that branch of work brings no proper returns, I maintain that it is the duty of a business woman to say, "This must be stopped," and at once proceed to turn the land or the stock to some other

purpose. I admit this is difficult : it requires the "trained capacity" and the outside grasp of a situation which can only come from experience. It is so natural to think that if you start a thing on carefully approved lines, given ordinary care and attention it is *bound* to succeed, and you will make it a personal matter that it should succeed, but when the hard fact comes that you are not getting a proper return for your money, your labour, your personal outlay, then the necessity arises to reform or to change.

An illustration

To illustrate my point with reference to the necessity for good ground for fruit trees. I have in my mind a certain piece of land in which I was interested some years back. I was advised to rent and turn it into a market garden and fruit farm. In my inexperience I thought the advice good, and entered upon my possession with all the ardour of a landed proprietor. The rent was fixed at a price absolutely prohibitive to *successful* market gardening, namely at £5 an acre, and there

were six acres, which meant in plain language that each year the cultivation was to be so intensive and the crops so good that each acre must give a return of £5 to pay for the rent alone, and quite four times that sum to pay for labour and cultivation and to give two or three per cent. on my capital. (I think I started by putting in £200.) Well, in other words, I must make £120 per annum out of the crops straight away. It was not pointed out to me that for several years this piece of land had been out of cultivation, that it was choked with weeds, and that there was no depth of soil over a subsoil of gravel. It was in October that my ardour was kindled, and in October and November weeds, as a rule, are not especially aggressive. So with a light heart I wrote to the best and most expensive growers for catalogues of their fruit trees, and as I ordered them—almost at catalogue price instead of wholesale, which every market gardener ought to insist upon having—I had visions of my garden being

white with blossoms in spring time, like the Kentish orchards, and heavy with fruit in the autumn. Moreover, it was to be planted on a great system which was to be original, and surrounded with a fruit hedge instead of a common thorn—why not turn every inch of ground to advantage? This hedge was to consist of blackberry brambles neatly trained with standard damson trees growing out of the thickness; in front was to be a row of alternate nuts and bush damsons, and in front of these again plantations of gooseberry and currant cuttings. Not content with common blackberries I bought about 50 or 100 roots of wineberries to give variety, and some hundreds of mirabella plums completed this unique hedge.

After three years what do I find? well, certainly, not the hedge, and nothing that could be dignified with such a title. Some gas lime shot down to make a gravel track, outside my boundary, got mixed in with the poor hungry soil and wrought death and

destruction to the hedge for about fifty yards, further up the soil was so poor that even brambles could not obtain nourishment enough to make them fruitful, and the standard trees are still *standards* and little else. Along the top where the soil is better the mirabella has flourished, and the bramble has straggled over the ground, and passers-by have some hindrance to their vision. It is a sad picture, but true nevertheless!

Then in the garden itself some 2000 black and red currant bushes, 1500 gooseberries, 1000 raspberries and standard plum trees were put in; that is to say, they were ordered by me and arrived on the spot, but as to the planting of this endless number of trees, for this in my inexperience I had made no adequate provision, as the amateur, until she has had a bitter experience, has but the poorest idea of how to deal with numbers. An old gardener, whose best days had ended ten or twenty years ago, and a young boy

constituted my staff. They worked and worked at these trees, but only *stuck* them into the *ground*; they did not *plant* them, and the crookedness of the lines was an eyesore from every point of view. As a result, the trees all had to be replanted—double labour—quantities of them died from exposure to the cold, and the next year bore only a most miserable crop. The black and red currants have “picked up” considerably now, and make a fine show, but the gooseberries are still the meanest little bushes you could see anywhere, although the raspberries deserve their name “superlative.”

Then another foolish thing was to order 17,000 cabbage plants; *Wheeler's Imperial*, I remember they were, and they cost £6, 11s. 6d. I was told that if planted in November they would come on in May when greens were scarce, and sell for 1½d. each easily. Seventeen thousand three halfpence, said I, means £106, 5s., so of course the prospect of cabbage growing seemed highly lucrative.



Lady Warwick Hostel—Pear Tree grafted by Students in 1899

Alas! there was the same trouble with the planting, and again the ground was so poor that the cabbages never made a success of themselves, and instead of being early on the market, they were greatly behind and sold at last for 3d. and 4d. a dozen. Under good management and with this dearly bought experience this particular six acres of land is now doing well, and is a credit to its cultivation, but I have given these facts and details, because it seems to me so much more helpful to give one's own practical experiences of a thing than merely to quote platitudes, and give statistics of work as it *ought* to be, but seldom is. I know how my own imagination was fired in this way, until it appeared to me that to be a market gardener was a certain step to becoming a rich woman if not a *millionairess*. Figures are so misleading, and the difference between practice and theory is hardly less so, while women as a rule are most nervous about venturing on undertakings connected with money risks;

therefore there is all the more reason to be cautious, and to be able to obtain solid and trustworthy advice when required.

A Summary To sum up these remarks on fruit growing, it is essentially a branch of work in which a woman ought to do well, as she can assist to plant, prune and tend the trees, gather and pack the fruit, and to send it to market, or sell it retail. Then, further, the preserving of fruit is distinctly within a woman's scope of activity, and in fact jam making, fruit bottling and drying when done on the spot would possibly prove more remunerative than selling the fruit in the first instance. For good jam there always seems to be a fair trade, and tons of pulped fruit to make the groundwork of common jam is imported annually. Again, *why* need it be imported? The bottling or sterilisation of fruit and vegetables in England is still in its infancy, and affords a hopeful outlook for the increase of fruit farms and orchards.



Lady Warwick Hostel—Potting Chrysanthemums

Market gardening will often include a ^{Market gardening} flower trade, especially flowers grown under glass, in order to put them on the market early ; for example, narcissi, daffodils, lilies of the valley, roman hyacinths, ordinary hyacinths, tulips, fresias and lilies of all kinds, notably arums ; spirea, and the great winter crop of chrysanthemums.

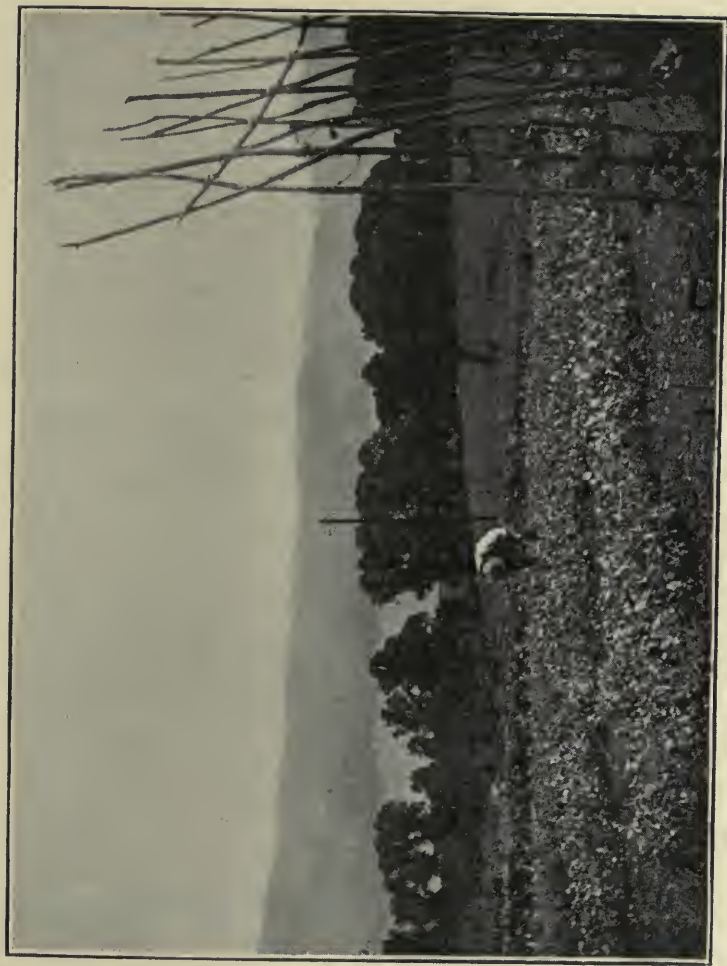
The culture of peaches and nectarines and forced strawberries in pots can be carried on very successfully, and they can follow on in a market grower's house when the chrysanthemums are over ; and these in their turn can be followed by tomatoes, so that a well managed house can be made to produce three distinct crops of marketable produce in the year.

To return to my previous remark, a general knowledge of gardening is invaluable to the successful market gardener or fruit grower ; therefore it seems well to obtain an all-round training at first, and afterwards to specialise in the particular branch it is desired to take

up. But in this, as in all other walks of life, "common sense" and judgment play an all important part, as well as the most desperate perseverance and untiring energy. Given these qualifications and a capital to start upon of not less than £200, and better still £500, there is every reason to suppose that in three years' time a woman could make her market garden a going concern in every sense of the word, and if she were able to co-operate with other women doing the same thing, a greater success still might be reasonably anticipated.

Dress for a
woman
gardener

Perhaps a few words might be added in conclusion on the subject of a suitable dress for a woman gardener. In the illustrations of life at the hostel scattered about the article it will be seen that the students wear a more or less conventional dress. It consists of a short narrow skirt about six inches off the ground, made of a thick serge or rough tweed, a pretty blouse (flannel in the winter), an apron or overall, a coat or jersey if necessary, thick boots, gaiters (in bad weather),



Lady Warwick Hostel—"A Steady Worker"

and a soft felt hat. These are now made in so many shapes and shades that it is quite easy to get a becoming one. The whole costume is business like and sometimes very artistic, without anything incongruous or offensive, and has evolved itself naturally out of the requirements of the students.

It seems a matter of considerable regret and an offence to good taste that in some institutions where women gardeners are employed they should be *made* to dress in men's clothes, especially as it is an unnecessary hardship, and one which causes sensitive women much unhappiness.

In conclusion, if asked an opinion upon Conclusion the openings for women in the twentieth century, one would say without hesitation, and after a close experience of five years, that for those to whom neither the literary professions nor teaching hold out any inducements, market gardening and fruit farming are healthful and profitable occupations, presenting, side by side with hard work,

attractions and resources, and an intimate connection with Nature, which will afford compensations of the most elevating and alluring kind, and which should and will act as a preventative of that habit of endless worrying over trifles, which is so often the bane and misery of the female mind, when its possessor is no longer fired by the marvellous vitality of youth.

One can look forward with certainty and with confidence to seeing many practical examples of the work which educated women can do, during the next ten years, when those who have been trained are in the full practice of their experience, and making happy homes for themselves amidst happy surroundings up and down the country.

DAIRYING

CHAPTER II

DAIRYING

IT is an acknowledged fact by men and The topic women of wide knowledge and high standing in the agricultural world, that women must play a prominent part in staying the depopulation of the rural districts, and in bringing people back to the land.

One feels safe in asserting that if a sufficient number of women will abandon the idea of lucrative and all-absorbing careers as governesses, typists and clerks, and turn their steps countrywards, they will draw a certain proportion of the sterner sex with them.

As these succeed and prosper—and they assuredly will if trained and made of the right material—others will be inspired to imitate them, and the thin end of the wedge

will be inserted in the problem of "How to ameliorate the conditions of Rural Life."

The object of this paper is to show how this may be forwarded by means of dairying, which is nowadays one of the most important branches of farm life ; indeed many of our farmers look to it to enable them to realise a profit on their land. There is no one connected with agriculture who is not heartily sick of hearing that "dairy farming does not pay," "we cannot compete with the foreigner," and so forth, until by dint of much telling it is accepted as truth. To make dairy work pay, it is necessary to have an intimate knowledge of the subject, practically and theoretically (above all practically), and also to be prepared to work one's self, thoroughly believing that "the master's foot manures the land," in a way that farmyard and artificial manures will never do.

In these days of keen competition and low prices there is no margin for waste or extravagance of any kind, the most minute

profits must be as carefully attended to as the large ones, and no *paid* labour will do that. Besides fortunes are not now made agriculturally, and any one going in for dairying expecting otherwise would do well to leave it alone, before he or she is disappointed. But there are numbers of occupiers of land on a small scale who are making an honest livelihood under conditions far happier and more congenial than if their lot were cast in the heart of some great town.

The financial
aspect

It is not enough to be a dweller in the town to become rich or famous, as so many of the thousands who rush thither seem to think. Of a thousand persons, perhaps one makes a fortune, while the other 999 strive and struggle in bitterest competition with each other, merely for the livelihood which they get at the expense of their own health and happiness, or at the expense of those who come after them. City life under these circumstances, as it is led by millions of our people, is degrading and demoralising to a

degree which is never found amongst a rural population. Close intercourse with nature cannot fail to have an ennobling influence, helping men and women to strive to lead more honourable and useful lives. Therefore, seeing what a matter of necessity is a prosperous country life to a country, both from a moral and a physical standpoint, it is the bounden duty of those in authority on matters agricultural to spare no pains to promote "the safety, honour, and welfare" of the rural population of Great Britain.

Suitable
localities

Many are the influences at work in the evolution of a successful Dairy farm. Butter and cheese depend largely for their quality on the skilful handling and the cleanliness of the dairymaid after the milk has been delivered into the dairy, but the finished product is enormously affected by various conditions long before the milk arrives at that stage. Climate, locality, soil, different breeds of cattle, and the manner in which they are fed and housed, have an important bearing on

the production of milk. Such being the case, it will be necessary to briefly discuss these points, before we arrive at the actual manufacture of butter and the various kinds of cheese.

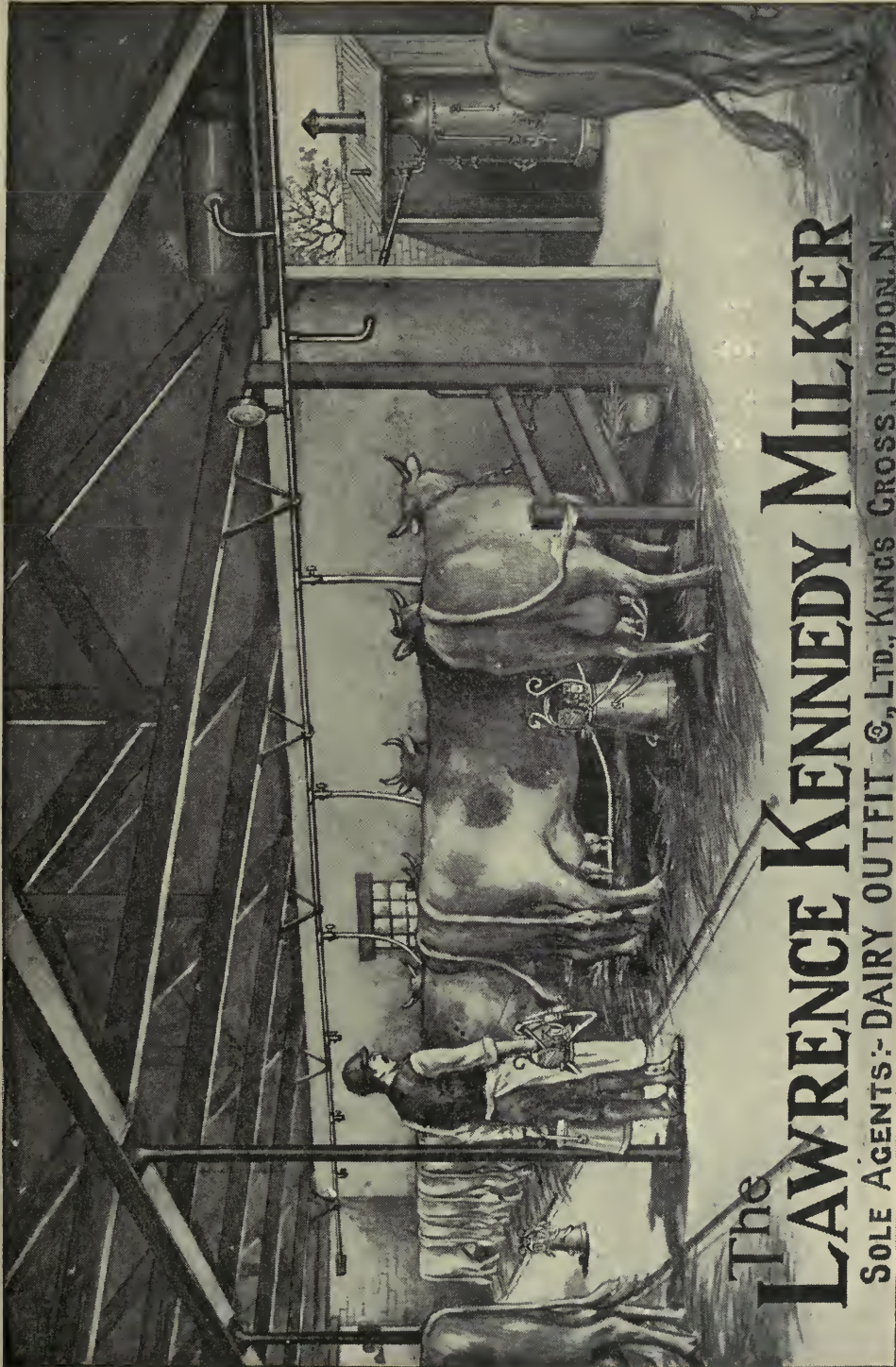
With regard to locality, the following points should be taken into consideration: (1) the quality of the available markets. It is a great thing to be able to manufacture good produce, but when one is working for one's livelihood the crux of the matter lies in the sale of it. A conveniently got-at and constant market would weigh considerably against possible inconveniences with regard to the land or the buildings. Unless one were building to suit one's own requirements, it would be extremely difficult in any locality to get all the conditions satisfactory. But the quality of the available markets should be given a prominent position. It should be clearly understood in saying this, that however good the market, on no consideration should bad land be taken. It is too costly at any price.

The cost
and supply
of labour

In some districts the labour question is much more acute than in others. On a dairy farm this consideration is especially important, as efficient milkers are an absolute necessity. Because of the scarcity in this respect, many farmers have been obliged either to considerably reduce their dairy herds, or, in some cases, to give up cows and keep sheep instead. It seems certain that sooner or later we shall have to have recourse to milking by machinery almost entirely. Many milking machines have been put on the market. At present the best of these is the "Lawrence Kennedy" milker, brought out by the Dairy Outfit Company.

Milking

At a farm near Datchet a herd of forty-eight cows is regularly milked by this means. The milker is actuated by suction, which may be obtained by an ordinary vacuum pump, worked by steam or oil or gas engine, or an electric motor. Connected with the vacuum producer is a vacuum-containing tank, and a range of pipes runs along the sheds,



The
LAWRENCE KENNEDY MILKER

SOLE AGENTS:- DAIRY OUTFIT & CO., LTD., KING'S CROSS, LONDON, N.

over the cows' shoulders. From this pipe a short branch descends between every alternate cow, having on it a vacuum cock. To work the apparatus one end of a rubber tube is put on to this branch, while the other end is connected to the pulsator, which rests upon a cone-shaped pail placed between the cows near the manger.

From the pulsator two rubber tubes branch out, right and left, one to each cow, and each tube is attached to four rubber teat-cups, which are slipped upon the teats of the cow.

When the vacuum cock is turned on, the pulsator commences to work, and causes the cups to collapse and expand, and thus suck the milk from all four teats at once, an almost exact imitation of the calf sucking its mother. One machine with a man and boy is said to do the work of six men skilled in milking, and with less labour to themselves. This machine is also working on two or three other farms, and is said to be giving satisfaction.

A dry, hot climate is not suitable for dairy- Climate
ing. The farm should be selected preferably
in the W., N.W. or S.W. of England, where
the rainfall is certain (this year, 1902, alas!
only too certain), and the extreme heat of the
eastern counties seldom experienced.

The question of suitable soil is quite Soils
one of the most important which has to
be considered, affecting as it does, not
only the health of the stock, but also the
quality of the ultimate product. The best
soils for the purpose are those of limestone,
sandstone or marl, producing sweet fine
herbage, containing a select collection of all
the best milk-producing grasses and clovers,
such land as is found in parts of Derby-
shire, Cheshire, Durham and Cumberland.
The great desideratum of pasture land is
that it should be not only fertile but
“sound.” That is, land that is naturally
well-drained.

Although there is much excellent land
used for dairying, which has been arti-

ficially drained, it can never be so satisfactory as that which is naturally sound. A sound soil is much warmer and drier, because the more water a soil contains the more slowly will it rise in temperature (owing to the high specific heat of water), and the more rapidly will it part with its heat. Unsound soils no doubt stand better in times of drought, but the many disadvantages in connection with them quite outweigh this one fact in their favour. Also the superior capillary attraction of a sound soil materially assists it in resisting and recovering from a dry spell.

Cattle fed on damp water-logged soils give milk which is a continual source of annoyance in the dairy, especially when used for cheese-making. This arises from the fact that all kinds of unfriendly bacteria flourish amazingly in milk produced on such land. On the other hand, for the production of clean, sweet milk nothing equals a sound, limestone soil. There is an enormous difference

in the length of time which milk from such land will keep, as compared with that from an inferior source.

It is also important that land should have a suitable subsoil. In alluvial soils it is generally of the same character as the soil. Light sandy soils do best on a clay subsoil, as the water does not pass so readily downwards. A clay soil resting upon sand or gravel is advantageous.

The maintenance of permanent pastures Manures and meadow land in good heart requires much care by the application of farmyard and artificial manures. To do this, in an intelligent manner, demands a knowledge of the chemistry of the soil, and of the constituents removed from it by different plants. All crops are influenced in a greater degree more by one special ingredient than by another, thus the cereals require nitrogenous manures; turnips and swedes, phosphatic manures; mangels, nitrogenous manures, and so on.

General principles must be adapted to suit the varying conditions of soil and climate, and also care must be exercised in mixing to see that no chemical action takes place which minimises the value of the manure. The most important constituents of soils are—

Silica	Soda	Chlorine
Alumina	Iron	Nitrogen
Lime	Phosphoric acid	Magnesia
Potash	Sulphuric acid	

These are present in varying degrees according to the nature of the soil. The chief manures are Green manures, either ploughed in or fed off, Farmyard manure, Artificial manure.

Farmyard manure is undoubtedly the most important of these, because if properly preserved it contains all the constituents removed from the soil by the crop. And it has an advantage over artificial manure in that it affects the soil mechanically as well as chemically, by reason of the large quantity of

organic matter which it contains. This has a very beneficial effect on the soils deficient in humus. Upon a dairy farm, where milk is sold, the land is being continually deprived of its phosphates. The best means of replacing this loss is by the application of bone meal. The most efficacious way of manuring pasture is by feeding stock upon it with cake. After which potash and phosphate only will be required.

It is a "penny-wise and pound-foolish" policy to be sparing in the application of manure; if the farmer is scanty in his supply, the land will reward him scantily. One of the most important parts of farm arrangements should be an adequate provision for the preservation of all the farm-yard manure, solid and liquid. On most ordinary farms the value lost for want of this is tremendous.

It is impossible in this short space to enter more fully into the merits and demerits of the different manures and their application. Suffice

it to say that a special study must be made of this point, so that it may be carried out intelligently. Successful manuring is not such a very simple matter. In any case, it *must* be done liberally, to obtain the best result from the land.

Breeds of
cattle

Before selecting any special breed of dairy cattle there are many points which should receive due consideration. We have seen that soil and climate have a considerable influence on the health of the stock, and the quality and quantity of the milk produced. In addition to these two factors the kind of land on which the cattle are to be maintained must be considered. As a rule, the larger breeds do best on rich soils, poorer class land being more adapted to the smaller and hardier cattle.

The chief dairying breeds of cattle in the United Kingdom are the

Shorthorn	Guernsey	Kerry
Ayrshire	Red Polls	Dexter Kerry
Jersey		

There are two chief strains of Shorthorn, ^{The} the "Bates" and the "Booth." ^{Shorthorn} The "Booth" is more for beef production and is large and darker, "Bates" is the milking strain. Of all the different breeds Shorthorns are the most widely kept. They give large quantities of excellent milk, well suited for either butter or cheese-making. A fair average quantity of milk for a Shorthorn cow per annum is 700 gallons, but they can give as much as from 1000 to 1200 gallons, and there are many dairy herds, well fed and housed, where the average of 700 gallons is higher. The Shorthorn has many points in its favour, such as (1) the power of adapting itself to almost any soil or climate. (2) When its milking years are over it can be fattened off and sold as beef at a fair price. (3) The calves are very saleable. In colour the Shorthorn is red, roan, or red and white; black or brindled indicates impurity of blood.

The Ayrshire is the favourite milking ^{Ayrshire} animal in the West of Scotland, and is a

typical dairy cow, being wedge-shaped, that is, narrow in the forequarters, gradually increasing in depth and width backwards. They are smaller and hardier than Shorthorns, also more energetic, thriving where a Shorthorn would starve. At the same time they do very well for rich soils and more genial climates, though after a time, under such conditions, they tend to lose their characteristic quality as a milk-producing animal only and begin to lay on fat. In colour they are brown, red, white, black, or these mixed in patches. The most common being red, with white patches. The fat in the milk of Ayrshire cows is in very small globules, which makes it more suitable for cheese than for butter-making, especially as it contains a large percentage of casein.

Jerseys and
Guernseys

Jerseys and Guernseys are very favourite cattle for private dairies, and are principally found in the southern half of England. They are not so hardy as our English cattle, and require a mild and less rigorous

climate. By means of legislation, preventing the importation of cattle into the Channel Isles, these breeds have been kept absolutely pure for centuries. They are essentially butter-making cattle, producing milk very rich in butter-fat, and the great size of the globules increases not only the quality but the quantity of the butter. With Jersey milk one pound of butter can be made from two gallons of milk or sometimes less, while with the other breeds it takes from two and a half to three gallons. It is a good plan to keep a few Jerseys or Guernseys in a milking herd, as their milk will assist in keeping up the colour and churnability of the cream. The Jerseys are fawn or silver grey in colour with sleek short hair, deer-like heads, and slender frames.

Guernseys are rather larger than Jerseys, longer in the body, and hardier altogether. They are usually of a yellow brown colour, but sometimes red and white with flesh-coloured noses. They are nearly as good

milkers and butter producers as the Jerseys, and are better for fattening. A Jersey cow when finished milking is practically of no value from a butcher's point of view.

Red Polls Red Polls are hornless breeds found in the eastern counties. Excellent beef and dairy cattle, in colour they are red, with light coloured udders, and white tail tassels. They are noted for their long milking periods.

**Kerry and
Dexter Kerry**

The only distinct Irish breeds are the Kerry and Dexter Kerry; they are small and very hardy. The Kerry is sometimes called "the poor man's cow," as it thrives on the poorest pasture, and can withstand bad weather with next to no shelter. The usual colour is black, but sometimes they are black and white, also brown or red. Dexters are heavier cattle, not so tall as the Kerries, and more compact looking. For their size they give a large quantity of milk, very rich in quality, which makes it most suitable for butter-making.

ANNUAL YIELDS OF MILK OF THE DIFFERENT
BREEDS

The standard proposed for the respective breeds by the British Dairy Farmers' Association for entering in the Dairy Cattle Register is as follows :—

Pedigree and Non-Pedigree.	Weight of Milk in the milking period, not exceeding 11 months. lbs.	Pure butter-fat per diem average of 2 tests as determined by analysis.
Shorthorn, .	8,500	1.25
Jersey .	6,000	1.25
Guernsey .	6,000	1.25
Ayrshire .	7,500	1.00
Red Polls .	7,000	1.00
Kerry and Dexter		
Kerry .	4,500	0.75
Dutch .	8,500	1.00

The standard for crosses of either of the above will be the mean of the standards for the pure breed. No animal will be admitted whose milk contains less than 12 per cent. of solids at any test.

No other country in the world has such a variety of excellent breeds of cattle both for dairying and beef production as is to be found in the British Isles. If a farmer breeds his own stock, he should only work from the best materials. Well bred stock are no more difficult or expensive to keep than inferior animals, and they will make a profitable return, which the latter can never do to the same extent. In breeding for the production of milk it is not enough that the dam should be a good milker, but care must also be exercised to see that the bull comes of a good milking strain. All cows whose milk does not come up to the required standard of quality and quantity should be gradually weeded out. To ascertain which are the inferior milkers it would be necessary to periodically weigh and test the milk of each cow. By using a "Sandringham" herd recorder it is a simple matter to weigh the milk every day. The milkers soon get accustomed to using

it, it is no trouble, and besides being a check upon them, any cow out of condition is quickly noted. In selecting a dairy cow there are certain external signs which should always be remarked. First, she should have rather fine, slender shoulders, but with a chest sufficiently wide and deep to ensure strength of constitution. A typical dairy cow should (1) be wedge-shaped, having great breadth across the hips, and tapering forward. (2) The skin should be soft and elastic, covered with soft silk hair. (3) Her udder should be large but not fleshy, well set forward under the body and back behind, large teats placed well apart and all perfect. (4) Prominent milk vein. More importance should be attached to the shape and texture of the udder and the set of the teats than to the relative size. (5) The escutcheon. This consists of the hair on the udder, which turns up and out instead of down. If the escutcheon is wide on the thighs, high and broad, it is taken to indicate a good milker.

The following excellent description of a good milker is taken from one of the Dairy Publications :—

A GOOD DAIRY COW

“ Long in her sides, bright in her eyes,
Short in her legs, thick in her thighs,
Big in her ribs, wide on her pins,
Full in her bosom, small in her shins,
Long in her face, fine in her tail,
And never deficient in filling the pail.”

Feeding To farm at all successfully, in face of the high prices which now have to be paid for feeding stuffs of all kinds, it follows that farmers and farmeresses must have a clear knowledge of the principles of feeding and the successful application of the same. The value of a food depends upon its composition and digestibility, the digestibility varying with the constituents it contains or with its mode of manufacture. The maintenance diet of an animal is the amount of food which it requires to meet the daily wants of the body.

It has been proved by experiment that the maintenance diet of an average Shorthorn cow, when dry, is fourteen pounds of digestible dry matter.

When in full milk and fattening, she requires nearly twenty-five pounds. An animal is like a machine, in that it is no more able to create within itself the power of doing work or of secreting milk than an engine would be if not supplied with fuel and water. The nutritive portion of food is divided into :—

(1) *Protein, or nitrogenous matter, made up of albuminoids.*—These are the only parts of food which are capable of building up the animal tissue of the body, repairing the daily wear and tear of bone, muscle, blood, etc.

(2) *Carbo-hydrates.*—Such as sugar, starch, digestible fibre, are heat and fat producers, heat being necessary to supply the energy of the animal body.

(3) *Fats and oils.*—These are of the same use as carbo-hydrates, but fat produces nearly

two and a half times as much heat and energy as the same weight of starch and sugar. Anything taken in excess of what is required for heat and energy is stored in the body in the shape of fat. The nutritive or albuminoid ratio of a food is the proportion which the digestible albuminoids bear to the digestible carbo-hydrates and fat together, one lb. of fat being equal to 2.25 lbs. of carbo-hydrates. Experiment has proved that for a cow in full milk the albuminoid ratio should be 1 to 5.6—that is, one part of flesh formers to 5.6 parts of heat, energy and fat. In summer the chief food of a cow consists of grass, supplemented with artificial food according to the quality of the land, and when the pasture begins to go off, with vetches, cabbages and lucerne, etc.

For feeding in summer cotton-cake may be used with advantage; it has a high manurial value, and its effect on the butter-fat is to harden it, which is a very valuable property where ice is unobtainable. Many farmers

do not approve of feeding with cotton-cake, because they say it has a bad effect on the calves; but if used in moderation, and not given within two or three months of calving, it is one of the most valuable foods the dairy farmer possesses, being rich in oil and albuminous matter. Winter rations are made up of roots, hay, straw and chaff, besides concentrated food, such as cake and meal. The cakes chiefly used in England are linseed-cake, decorticated and undecorticated cotton-cake.

Linseed-cake is a very good and safe food for cattle, especially for calves, but it is more expensive than cotton-cake, and, unless great care is exercised, it gives an oily, unpleasant taste to the butter. Decorticated cotton-cake is a most valuable food, but being highly concentrated must not be used in too large quantities. Undecorticated cotton-cake should only be given in summer, when the cows are on grass. Rake-cake, palmnut-cake and cokernut-cake are useful food, and much

appreciated on the Continent, though little used over here. Bean meal is a highly nitrogenous food, and an excellent addition to a ration mixed with chaff and pulped roots.

Pea-meal has much the same property as bean-meal. The two following winter rations have been found to give excellent results:—

45 lbs. swedes	45 lbs. swedes
16 lbs. oat straw	9 lbs. hay
6 lbs. hay	10 lbs. oat straw
4 lbs. crushed oats	4 lbs. maize meal
4½ lbs. D. C. cake	4½ lbs. D. C. cake

The hay should be given long, a mixture of chaff, pulped roots, and meal together, and the cake as a separate meal. The cooking of food for cattle, no doubt, increases the quantity of milk given, but the food is not rendered any more digestible, and the cows seem to be more delicate.

The chaff may be sprinkled with hot water, or slightly steamed.

The secretion of milk is closely related to ^{Housing} the nervous organisation of the cow, and therefore everything that conduces to the comfort and tranquillity of the animal aids considerably in increasing the milk yield. Considering what a large part of the life of a cow is spent in the cow-byre, everything possible should be done to make it suitable to the requirements of the animal with regard to requisite space, light and ventilation, and cleanliness.

According to the bye-laws, each cow is required to have an air space of 600 cubic feet; some authorities advocate 800 to 1000. It is quite possible to have a cubic air space of 600 feet, and for the cowshed to remain ill ventilated and unhealthy. Where the cowhouse is kept very clean, with a satisfactory ventilating system, the cows will do quite well with 500 cubic feet or even a little less per cow, especially in the country. In town dairies it is another matter. The point is that a proper

system of ventilation is much more important than an air space of 800 cubic feet with inferior or no ventilation. The cowshed should be frequently whitewashed and exposed as much as possible to the sunlight.

After milking morning and evening, the manure should be wheeled away, and deposited some distance from the shed. No cleaning out should take place either just before or during milking, because in disturbing the manure the air becomes heavily laden with injurious bacteria, and if milking is going on, millions are absorbed by the milk with the result that the butter or cheese has an undesirable flavour.

Stalls If the cows are to be clean and comfortable, the stalls should be constructed to suit the size of the animal.

The best width for a double stall is from six to seven feet, seven feet for the large breeds such as Shorthorns. It is not at all necessary to have a passage in front of the

cow. It takes up a large space, and it is really quite as easy to feed the cows from behind.

The best manger is a glazed fire-proof The Manger trough, 16 inches wide by 9 inches deep. The standing room between the manger and the gutter should be $5\frac{1}{2}$ to 6 feet long.

The gutter should be 24 inches wide and 8 inches deep, with a passage at the back 6 feet wide, so as to give plenty of room for the removal of the manure, and for the coming and going of the cows.

The floor should be of bricks set in cement, The Floor or cement concrete which is better, with a slight slope towards the gutter to carry off the manure.

Milking should take place at regular Milking intervals. Cows are sensitive and easily disturbed, therefore they should be treated in a kindly, gentle manner if the highest returns are to be secured.

The character of the milk is to some

extent determined by the treatment accorded to the cow. The amount of butter-fat, upon which the commercial value of the milk depends, is lessened by harsh, rough treatment, or other adverse conditions, such as exposing the animal to sudden changes, low temperatures, fast driving, change of milkers or milking hours, in fact, any noise or treatment which excites or annoys them. This is especially noticeable in well-bred cows or deep milkers. The first process of milking is to thoroughly wipe or wash the udder. The milker should wear a clean overall, and have clean hands with short nails. Milking should be done with dry hands. The action of milking is done more by creating a vacuum in the teat by firmly opening and closing the fingers from the base of the teat downwards than by squeezing or pulling. Milking should be done rapidly. The quicker the milking the richer the milk.

The first milk drawn is always deficient in butter fat, increasing in quality until the last

milk, known as "strippings," contains sometimes as much as ten or twelve per cent. of butter fat. Complete stripping encourages the milking habit, and even when no more milk comes, milking should be carried on for a minute or two to stimulate the milk glands; on the contrary, insufficient stripping entails a great loss of fat, besides gradually diminishing the quantity of milk and oftentimes spoiling a good cow.

After milking, the milk should be weighed, and at once removed to the dairy.

The best temperature for a cowshed Temperature would be from 58° to 60° F., but this is very difficult to maintain. If the temperature does not go below 55° , the cows do very well.

The food is first used to repair the waste in the body, and to keep up the required temperature (101°), and after that for the secretion of milk. Therefore if the sheds are very cold, a great part of the food is used to maintain the heat of the body,

which would otherwise go towards increasing the milk flow.

On the other hand a higher temperature certainly conduces to a larger milk yield, but, as a rule, the cows are not so healthy, and are very liable to cold, so that in the long run, by having stronger and healthier herds, more milk of a better quality will be obtained. Cows should be turned out every day, all through the winter, for a longer or shorter period according to the weather. This will slightly lower the milk yield, but the above remarks on the subject of temperature apply here also with regard to the increased healthiness of the stock, and such food as roots and cabbages may safely be fed out of doors without imparting the disagreeable flavour that is so much disliked. Turning the cows out also gives an opportunity for thoroughly airing and purifying the cowshed.

The Dairy For the production of the best dairy produce a suitable dairy must be provided, where,

if possible, the following requirements should be considered.

It should be well removed from the cow- Situation shed, piggeries and manure yard, as no other liquid absorbs odours in the same way as milk. Where possible it should have a northern aspect.

The walls should be of brick, those facing Walls inwards being glazed. An air space between the walls is a great help in maintaining a uniform temperature, for the same reason a thatched roof is best.

For the floor concrete is best, sloping Floor slightly to an open gutter which carries the water outside the building into a trap drain. There must be no drains in the dairy.

Ventilators near the floor at each end Ventilation of the room, and one in the centre of the roof.

Ordinary windows with blinds of fine gauze Windows wire.

Uniformity of temperature is most neces- Temperature sary. Means should be provided for exclud-

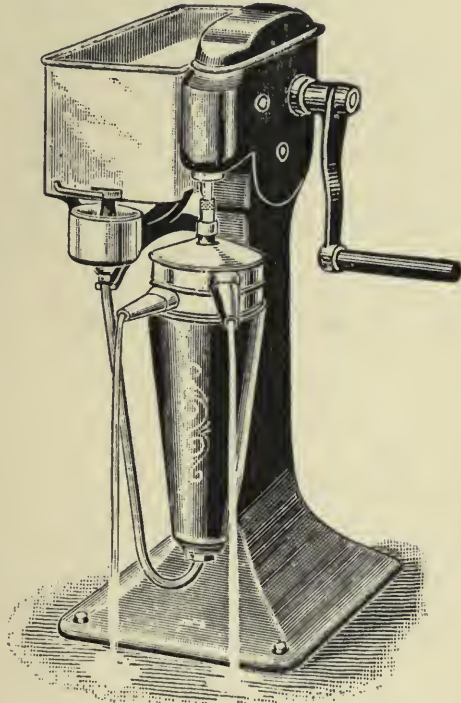
ing the heat in summer, and for warming the dairy in winter. Heating is done preferably by hot water pipes, or by a slow combustion stove. The best temperature is as close to 60° as possible all the year round. If too dry and hot, a hard crust will form on the ripening cream, and if too cold, it absorbs all the impurities in the air.

To insure success in dairying, perfect cleanliness is absolutely essential. The best dairy and appliances in the world are worthless, if not combined with cleanliness. In fact, it is the whole secret of the business from cowshed onwards to market.

Cream
Raising

Where there are even only a small number of cows, it will be found more profitable to use a separator, because (1) more cream is obtained; (2) the cream is obtained quite sweet, and may be sold in jugs or ripened for butter-making; (3) the separated milk is fresh and much more valuable for feeding young stock than skim milk, and in districts where there is a demand for it, it may be

sold at a cost of from 1d. to 2d. per quart. For a dairy of more than twenty cows it would be best to have a separator and a small steam-engine. In addition to working the separator, this power can, if required, work the churn and butter-worker, besides supplying all the hot water, and last but not least, all dairy utensils can be

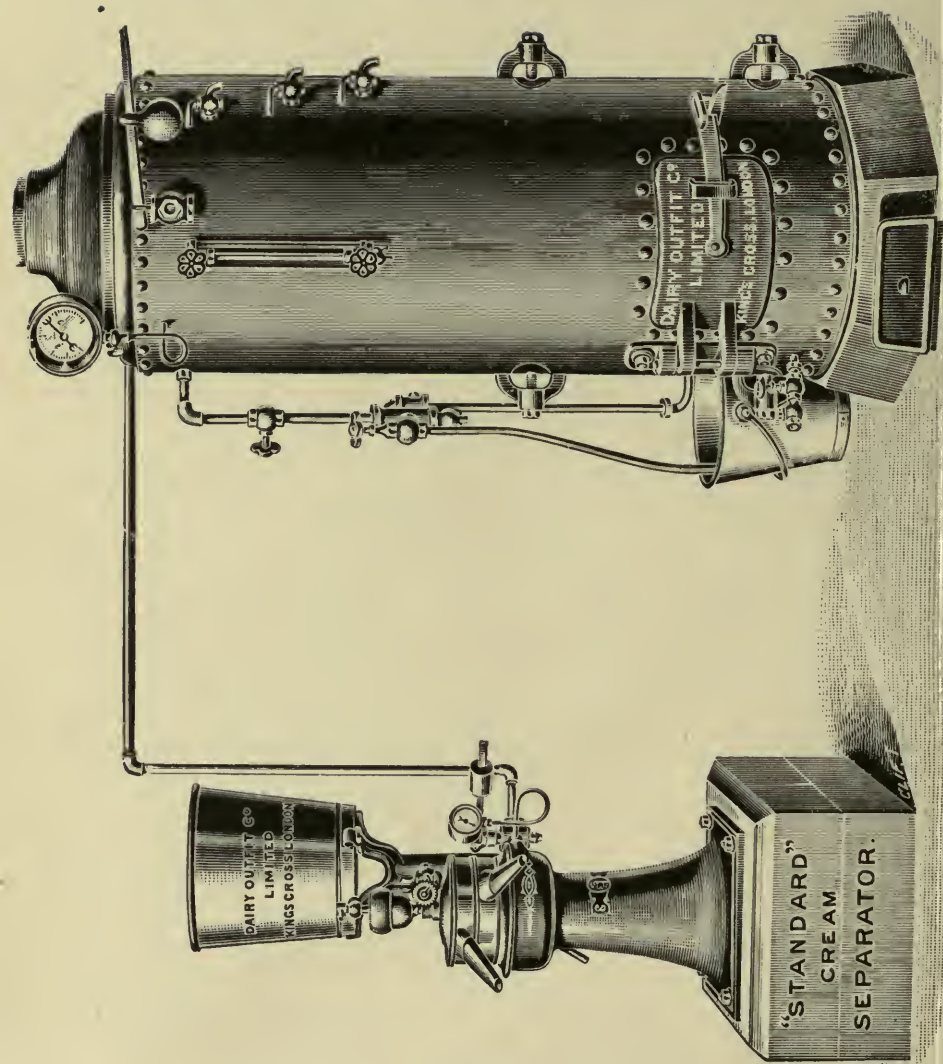


Hand Separator

thoroughly cleaned and purified each day with live steam, than which there is nothing more efficacious for cleansing.

Shallow pans setting is still continued in some dairies, and there is no doubt that

Shallow pans
setting



Steam Separator and Boiler

where conditions are favourable the butter produced from this cream excels all other in flavour, but the maximum yield of butter is not obtained.

BUTTER-MAKING

In feeding for butter and cheese making more care is required than when the milk is sold. For this purpose the milk is best when the cows are on grass. Very often in the summer they receive, in addition, cotton-cake or linseed-cake, poor in oil; where the rich cake is used the butter is sometimes affected.

As butter is made all through the year, a great part of the time the cows are on winter rations.

Either of the rations already given will produce good milk. Swedes and mangels are most valuable foods on the farm, but they must be fed with great care, always immediately before or just after milking or else out of doors, to prevent taint in the milk, and consequently in the butter also.

Swedes are preferable to mangels, as they produce butter of a better colour.

Cabbages are also a useful food, but the same care must be observed in their use as in the case of roots; they produce rather pale butter, wanting in flavour. Cotton-cake, linseed cake (poor in oil), bean and pea meal, maize meal, crushed oats, are all excellent concentrated foods for butter production.

Brewers' grains should be used very sparingly, or preferably not at all.

Treatment
of milk for
butter-
making

The milk having arrived in the dairy, it is strained and separated. When drawn from the cow it is at a temperature of 95° F.; 90° to 95° F. is the right heat for separating, so that the milk should be separated immediately it comes into the dairy before it has lost its animal heat, otherwise where it has fallen below 90° F. it entails the labour of reheating.

The next process is the ripening of the cream for churning. By ripening, in the ordinary sense, is meant the production of a

certain amount of lactic acid in the cream. This is done for the following reasons :—

1. To yield the largest possible quantity of butter.
2. The churning period is shortened.
3. The flavour is improved.
4. The removal of the buttermilk is rendered more complete, and
5. As a consequence the butter keeps longer.

To know just when the right stage of acidity has been reached is a matter of experience. Tests such as litmus paper and the acidimeter may be used, but usually the dairymaid must be able to decide by means of taste and smell and the appearance and texture of the cream when it is ready for churning.

Cream may be ripened : —

1. Naturally, by leaving it exposed to the air for a longer or shorter period, according to the surrounding temperature. In summer, ripening will take place in from twelve to

twenty-four hours, and in winter from two to three days. The results by this method are uncertain. The best temperature, where cream is ripened after this fashion, is from 58° to 60° F.

2. The cream may be raised to 95° (the temperature at which bacteria work best), and is then allowed to fall to the temperature of the air, after which ripening is very much hastened.

3. By adding a "starter" to the cream. A starter may be any liquid in which a considerable quantity of acidity has been already developed, such as sour milk, cream, or butter-milk, or it may be a liquid inoculated with a pure culture of the lactic acid bacillus. Ripening is brought about by certain kinds of micro-organisms, which in their growth produce lactic acid. By obtaining the desired kind of micro-organism and growing it alone, a "pure culture" is the result. This "pure culture" is next put into milk, which then becomes "a starter."

With regard to the use of pure cultures there is great diversity of opinion. In this country they are comparatively little used, but in Germany and Denmark, especially the latter country, nearly all the butter produced is made from cream, first pasteurised and then ripened with an artificial bacteria culture. In careful and experienced hands, their use is followed with excellent results, but where all the surroundings are cleanly and the atmosphere pure, the use of such artificial means is not necessary to procure butter of the finest quality.

The texture of the butter is largely influenced by the temperature which the cream undergoes whilst ripening.

It has been proved that to secure a really firm butter, the cream should be reduced to a temperature, if possible, below 50° F. for several hours before ripening begins. When cream has been separated by the deep setting system, it has already experienced this temperature, and is ready

for ripening when removed from the milk. In ripening separator cream, the first thing is to reduce the temperature as rapidly and as uniformly as possible to below 50°. Cream during ripening should not be subjected to sudden and great changes of temperature. When cream of different ages is to be mixed for use, it must be done at least twelve hours before churning, otherwise a certain amount of butter fat is lost.

The best
churn

The best churn is one which churns by concussion, not friction; "Bradford's Diaphragm" and the "End over End" churns are most satisfactory. They are easily cleaned and emptied, and the progress of the churning can be observed through the glass fixed in the lid of the churn.

A valve is also provided for ventilation. It is usual in churning to make from fifty to sixty revolutions per minute, but each churn has a certain speed at which the best results are attained, this speed should be ascertained

and adhered to. Perhaps the most important point in churning is the temperature of the cream, which must be regulated according to the temperature of the air. The following table is often used as a guide :—

Temp. of Air.	Temp. of Cream.
66° F.	55° F.
64° F.	56° F.
62° F.	57° F.
60° F.	58° F.
58° F.	59° F.
55° F.	60° F.

When too thick the cream should be thinned by the addition of water.

The best results are obtained with a consistency yielding three pounds of butter to every gallon of cream.

Sometimes in winter, to meet the demand Colouring of the market, it is necessary to colour the butter. The best way to do this is to keep a few Jerseys in the herd, the milk of these cattle being so rich in colour that a small

quantity added to a considerable bulk of ordinary milk will usually be sufficient to keep up the necessary colour. The milk of cows which have calved a long time and are going dry is also deficient in colour, and too many of these "stale" cattle should not be allowed in a butter-making herd at the same time. Otherwise one of the many preparations of annatto, for instance, "Danish butter colour," may be used. It must be carefully measured and diluted with water, and the quantity used must be according to the depth of colour required.

One drachm will be sufficient for from two to six gallons of cream.

Preparation
of utensils

The churn should be scalded with boiling water, and then well rubbed over with salt, after which it must be reduced to the desired temperature by means of cold water.

The butter worker, Scotch hands, butter board, etc., must all be treated in the same fashion. Having prepared the cream and

churn, cover the mouth of the churn with a strainer cloth, and carefully pour in the cream, gently squeezing the last through with a squeegee, against the side of the churn. At starting the churn should be turned slowly, and at about every eight turns it must be ventilated by means of the valve in the lid until no more gas is given off. This is gas which has been formed by some of the fermentations going on in the cream, and it is liberated during the first few minutes. Having gradually arrived at the necessary speed, this must be maintained regularly until the butter "breaks," that is, until the fat globules have united to such an extent that they are visible on the glass in the lid of the churn.

Then open the churn, and add the "breaking water,"—*i.e.* the water which is added to assist the butter to break into granules and to reduce the temperature,—at the rate of from one to two quarts to each gallon of cream, according to circumstances, which will

be understood by experience. This is to reduce the temperature and prevent too rapid gathering of the butter granules. After this, churning is proceeded with till the grains are about the size of half a grain of rice.

At this stage the butter-milk should be drawn off, through a hair sieve covered with butter muslin, and the butter allowed to drain thoroughly. Water, at a temperature of from 45° to 55° (according to the season), is used for washing. It should be strained into the churn which is revolved about five or six times, the water is then withdrawn, and the butter allowed to drain as before, after which the second washing water is added in the same manner.

The quantity of water used each time should be about the same as the amount of butter-milk withdrawn.

As little washing should be done as possible, and, if properly carried out, two waters ought to be sufficient; the addition of a small amount of salt to the first water helps

to remove the butter-milk without perceptibly salting the butter.

The usual method is to use a brine ^{Salting} made by adding two pounds of salt to each gallon of water, and leaving it on the butter for ten to fifteen minutes. There should be just enough brine to cover the butter. The amount of salt used is a matter of taste, and the brine must be made to suit the requirements of the market.

After brining, the butter is removed from the churn to the worker by means of a wooden scoop. Butter should never be touched by hand. The worker is used to solidify the grains, and to press out the superfluous moisture. Great care should be exercised in using the worker, as carelessness in this respect very often completely ruins the texture of the butter. The action should be pressure, without grinding or rubbing, and the movement of the roller should correspond to that of the frame, otherwise the butter will be injured. It should be

worked until all the free water is expelled, and, at this stage, properly made butter should, when broken, have the appearance of cast iron. If the butter is soft, do not finish working it, as it is impossible to do so without injury. Remove it to a cool place, and leave it for as long as possible to harden, when it may be finished off and made up in safety.

Dry salting When dry salting is done, the salt should be added to the butter just after it has been removed from the churn. Pure dairy salt only should be used. It is generally added in the proportion of a quarter to three quarters of an oz. to the lb., according to taste. First, roll the butter out and sprinkle on it half the salt, then roll it up and spread out again, after which the remainder of the salt is added. When this has been well worked in, it should be removed to a cool place and left for as long as possible—in any case, not less than thirty minutes, to give time for all the salt to be dissolved.

After that, the working may be finished. Salt has a deepening effect upon the colour of butter, therefore if it is made up while some of the salt remains undissolved in places, the result is a speckled or mottled appearance, owing to the water in the butter dissolving the salt at those particular points and deepening the colour.

Butter which is intended for immediate consumption may contain more water than that which is to be kept for any length of time. It is usually made up in 1 lb. or $\frac{1}{2}$ lb. bricks or rolls. Various sized bricks have been made, but since this shape has become so popular, a standard size has come into general use— $5\frac{1}{2}$ by $2\frac{1}{4}$ by $2\frac{1}{4}$ inches. These bricks are wrapped in grease-proof paper, and packed in specially made boxes. These are best made of wood, as cardboard is liable to taint the butter if it remains in it for any length of time. The average composition of butter is:—

Fat	.	.	85 per cent.
Casein	.	.	1 „
Salt	.	.	2 „
Water	.	.	12 „

Except under most favourable circumstances, butter-making is the least profitable branch of dairying. It takes usually three gallons of ordinary cow's milk to produce 1 lb. butter, which realises on an average 1s. 2d. per lb. This equals only just over 4½d. per gallon.

MILK SELLING

This is the most profitable and least troublesome method of disposing of milk on a dairy farm. In many cases, where formerly butter and cheese were largely made, raw milk is now the staple commodity. The composition of good milk is as follows:—

Water	.	.	.	.	87·60
Fat	.	.	.	.	3·25
Casein	.	.	.	.	3·40

Albumen	.	.	.	·45
Sugar	.	.	.	4·55
Ash	.	.	.	·75

Milk intended for consumption as such must be: 1st, of high quality, as far as its composition is concerned (the Government standard requires that it should contain, at least, 3 per cent. of fat and 8·5 per cent. of solids, not fat); 2nd, produced by healthy, well-fed cows, kept in clean, properly ventilated sheds; 3rd, it must be clean.

In view of the milk standard, and the attention which public bodies are bestowing upon the question of our milk supply, it behoves all farmers to awake to the fact that, if they wish to place upon the market a milk such as is now required, very different methods of production and treatment will have to be adopted. First and foremost it will be necessary for them to know the quality and quantity of milk given by each cow. This may be satisfactorily and easily

arrived at by the use of one of the various milk-testers now to be had. The Gerber Milk Tester, obtainable from the Dairy Supply Company, is, perhaps, the most satisfactory for the ordinary farmer. As already stated, the milk from each cow should be weighed daily ; in some places it is done weekly, but this is not nearly so advantageous, and is very apt to be forgotten altogether.

The machine stands in the shed, and after weighing the milk, the amount is at once entered on the sheet which bears the name of each cow. If this were done farmers would be surprised, in many cases, to find that they were housing and feeding animals which were not worth their keep, and in time this weeding out of all cows giving milk poor in quality or quantity would tend considerably to improve the milking herds of the country.

A well-bred, profitable cow costs no more to keep in labour and food than a poor one, therefore why not go to the trouble of

finding out which are the poor ones and getting rid of them at the earliest opportunity? Just as milk is prepared for cheese-making and cream for butter-making, so milk should be prepared for sale.

Cleanliness is equally important, whether the milk is intended for consumption as such, or for manufacture. All the precautions already mentioned with regard to milkers and milking should be taken to prevent the access of dirt, or taints to the milk whilst in the shed. The vessels used for containing milk should be of the best tin ware (with all seams smoothly soldered), kept scrupulously clean and bright. Milk is much more easily removed from utensils when it has not been allowed to dry on their surface. Therefore they should all be rinsed with tepid water immediately after use, then thoroughly washed and scrubbed, especially in the seams, with hot water, after which they should be steamed for a few minutes. When dry, if possible, they should be placed in the sun-

light, and with this treatment they will always be clean and sweet. It may sometimes be necessary to give a good scouring with soap or soda, but when this is done the vessels must be thoroughly scrubbed out with hot water before steaming. It is essential that when not in use they should be kept in a clean atmosphere. As soon as the milk is drawn from the cow, it must be at once removed from the cowshed to the dairy to be strained, aerated and refrigerated. It is then ready to be despatched to the consumer or retailer.

Properly handled, milk which can be reduced to a temperature of from 45° to 50° F. should keep good for over forty-eight hours. Hitherto there has been greater license in feeding for milk selling than for butter and cheese-making. Now, however, more care in this respect will have to be exercised so as to keep up to the required standard. Some of the best milk-producing foods are hay, straw, roots (carefully fed),

cabbages, lucerne, linseed-cake, D. C. cake, ground oats, bran, beanmeal and Indian meal, maltcombs, maize.

Of the concentrated foods, an animal should receive up to eight lbs. per day for each two gallons of milk produced. Succulent food must not be given in too great quantities, especially forcing foods, such as brewers' grains. Some milk contractors stipulate that these shall not be given at all, as they produce a very "unstable" milk, *i.e.* milk which sours rapidly.

Where farms are situated near the town, ^{Delivery} it will pay the farmer much better to retail his own milk as he will then get (according to locality) 3d. to 4d. per quart for it.

In most cases, however, from different reasons, this is not practicable, and it has first to be sent to the retailer who delivers to the householder. The farmer then realises from 6d. to 8d. per imperial gallon as an average price all the year round. In London milk is bought by the large dealers by the

“barn” gallon, which consists of seventeen pints. The average price is 1s. 2d. per “barn.”

Milk is bought by contract usually for six or twelve months.

The contracts are made at the end of March, which, from the farmer's point of view, is a very bad arrangement. At that time of year milk is plentiful, and for fear of having large quantities left on his hands he often has to make contracts at a price which does not even pay expenses, when later on in the season milk becomes scarce. To get the best return from his cows, the farmer would do well to utilise the milk for cheese-making during two or three months in the year, say from the middle of April to the end of June. He would then be much better able to dictate his own terms when he came to put his milk on the market, and in the long run the monetary advantage would quite outweigh the extra trouble involved.

If a certain number of farmers could be induced to adopt this course, the market price of milk would be considerably enhanced. Wherever possible milk should be sold by weight, and according to the amount of butter fat which it contains. This method is always adopted in the case of selling to factories or creameries, where the milk is tested immediately on delivery: the farmer obtains from 1s. to 1s. 2d. per lb. of butter fat, and he also receives back the separated milk. By this means the man who keeps well-bred cows and feeds them properly is placed in a much better position than his neighbour, who perhaps cares nothing for the quality of the milk and feeds only for quantity.

Unfortunately, this system is hardly practicable except in the above instances, where it should always be insisted upon.

In talking of milk selling it should be mentioned that there is an increasing demand for sterilised milk. The appliances for doing this are now so simplified that it would be

possible for anyone to carry this out successfully with little extra trouble. It realises 5d. a quart, and as there is no expense in the manufacture of it, beyond the heating apparatus, it will be seen that milk sold at that price should return a handsome profit. The most expensive item in connection with it is the bottles, but as these are charged to the customer, in addition to the 5d. paid for the milk, that point is not of so much consequence to the producer.

FIFTY DAIRY RULES

The following valuable set of rules are issued by the U.S. Dept. of Agriculture. A large edition printed on card can be obtained, suitable for posting in the cowhouse or dairy:—

THE OWNER AND HIS HELPERS

1. Read current dairy literature and keep posted in new ideas.

2. Observe and enforce the utmost cleanliness about the cattle, their attendants, the stable, the dairy and all utensils.
3. A person suffering from any disease, or who has been exposed to contagious disease, must remain away from the cows and milk.

THE STABLE

4. Keep dairy cattle in a room or building by themselves. It is preferable to have no cellar below and no storage loft above.
5. Stable should be well ventilated, lighted, and drained ; should have tight floors and walls and be plainly constructed.
6. Never use musty or dirty litter.
7. Allow no strong smelling material in the stable for any length of time. Store the manure under cover outside the cow stable, and remove it to a distance as often as practicable.
8. Whitewash the stable once or twice a

year ; use landplaster in the manure gutters daily.

9. Use no dry, dusty feed just previous to milking ; if fodder is dusty, sprinkle it before it is fed.
10. Clean and thoroughly air the stable before milking ; in hot weather sprinkle the floor.
11. Keep the stable and dairy room in good condition, and then insist that the dairy, factory, or place where the milk goes be kept equally well.

THE COWS

12. Have the herd examined at least twice a year by a skilled veterinarian.
13. Promptly remove from the herd any animal suspected of being in bad health, and reject her milk. Never add an animal to the herd until certain it is free from disease, especially tuberculosis.
14. Do not move cows faster than a comfort-

able walk while on the way to place of milking or feeding.

15. Never allow the cows to be excited by hard driving, abuse, loud talking, or unnecessary disturbance ; do not expose them to cold or storms.
16. Do not change the feed suddenly.
17. Feed liberally, and use only fresh, palatable feed stuffs ; in no case should decomposed or mouldy material be used.
18. Provide water in abundance, easy of access, and always pure ; fresh, but not too cold.
19. Salt should always be accessible.
20. Do not allow any strong flavoured food, like garlic, cabbage, and turnips, to be eaten, except immediately after milking.
21. Clean the entire body of the cow daily. If hair in the region of the udder is not easily kept clean, it should be clipped.

22. Do not use the milk within twenty days before calving, nor for three to five days afterwards.

MILKING

23. The milker should be clean in all respects ; he should not use tobacco ; he should wash and dry his hands just before milking.
24. The milker should wear a clean outer garment, used only when milking, and kept in a clean place at other times.
25. Brush the udder and surrounding parts just before milking, and wipe them with a clean, damp cloth or sponge.
26. Milk quietly, quickly, cleanly, and thoroughly. Cows do not like unnecessary noise or delay. Commence milking at exactly the same hour every morning and evening, and milk the cows in the same order.

27. Throw away (but not on the floor—better in the gutter) the first few streams from each teat ; this milk is very watery and of little value, but it may injure the rest.
28. If in any milking a part of the milk is bloody or stringy or unnatural in appearance, the whole mess should be rejected.
29. Milk with dry hands ; never allow the hands to come in contact with the milk.
30. Do not allow dogs, cats, or loafers to be around at milking times.
31. If any accident occurs by which a pail full or partly full of milk becomes dirty, do not try to remedy this by straining, but reject all this milk and rinse the pail.
32. Weigh and record the milk given by each cow, and take a sample morning and night, at least once a week, for testing by the fat test.

CARE OF MILK

33. Remove the milk of every cow at once from the stable to a clean, dry room, where the air is pure and sweet. Do not allow cans to remain in stables while they are being filled.
34. Strain the milk through a metal gauze and a flannel cloth or layer of cotton, as soon as it is drawn.
35. Aerate and cool the milk as soon as strained. If an apparatus for airing and cooling at the same time is not at hand, the milk should be aired first. This must be done in pure air, and it should then be cooled to 45 degrees if the milk is for shipment, or 60 degrees if for home use or delivery to a factory.
36. Never close a can containing warm milk which has not been aerated.
37. If cover is left off the can, a piece of cloth or mosquito-netting should be used to keep out insects.

38. If milk is stored, it should be held in tanks of fresh, cold water (renewed daily), in a clean, dry, cold room. Unless it is desired to remove cream, it should be stirred with a tin stirrer often enough to prevent forming a thick cream layer.
39. Keep the night milk under shelter so that rain cannot get into the cans. In warm weather hold it in a tank of fresh cold water.
40. Never mix fresh warm milk with that which has been cooled.
41. Do not allow the milk to freeze.
42. Under no circumstances should anything be added to milk to prevent its souring. Cleanliness and cold are the only preventives needed.
43. All milk should be in good condition when delivered. This may make it necessary to deliver twice a day during the hottest weather.
44. When cans are hauled far, they should

be full, and carried in a spring waggon.

45. In hot weather cover the cans when moved in a waggon, with a clean wet blanket or canvas.

THE UTENSILS

46. Milk utensils for farm use should be made of metal, and have all joints smoothly soldered. Never allow them to become rusty or rough inside.
47. Do not haul waste products back to the farm in the same cans you use for delivering milk; when this is unavoidable, insist that the skim milk or whey tank should be kept clean.
48. Cans used for the return of skim milk or whey should be emptied and cleaned as soon as they arrive at the farm.
49. Clean all dairy utensils by first thoroughly rinsing them in warm water; then clean inside and out with a brush and hot water, in which a cleansing material

has been dissolved, then rinse, and lastly sterilise by boiling water or steam. Use pure water only.

50. After cleaning, keep utensils inverted in pure air and sun if possible, till wanted for use.

CHEESEMAKING.

We are accustomed to hearing that bread is the staff of life. It follows that, if the great desideratum of working men and women is to earn their "bread and cheese," next in importance to the staff of life, comes cheese.

Therefore, for an article of such importance in the commissariat department, there must always be a sure and steady sale. Cheese-making is a more difficult art than butter-making, as the number of conditions which have to be taken into account in connection with it are much more numerous than in the case of buttermaking.

A successful cheesemaker must thoroughly

understand, not only the principles of cheese-making, but also the principles of milk production and management. He must have a knowledge of the influence of different soils on the character of the milk and be able to alter the conditions of manufacture to suit its requirements.

For instance, in making cheese from milk, produced on a limestone soil, it is necessary to adopt lower temperatures during the process of manufacture, because such milk has great keeping qualities and acidifies slowly. On the other hand, higher temperatures must be adopted in the case of milk from gravel or clay soils which are deficient in lime.

Roughly speaking, cheese consists of fairly equal proportions of casein, water, and fat, with a certain proportion of ash, and very small quantities of milk sugar. Casein is the most important constituent of cheese, and milk intended for cheesemaking has always been valued according to the amount of

casein it contained, irrespective of the fat.

However, it is now being gradually accepted that the fat is of nearly equal importance with the casein. Hence the richer the milk is in fat, the more cheese it will make. As the result of numerous experiments, carried out by Dr Van Slyke, it has been proved that the percentage of casein increases in proportion to the increase of fat, up to a certain point (about 4.5% fat).

Casein in milk exists in a semi-dissolved or colloidal form.

The object of the cheesemaker is to Rennet change it from the soluble to the insoluble or coagulated form. During the process of coagulation, the casein entangles the fat in its mass. The coagulation of the casein may be effected by different re-agents, but the one usually employed is rennet, which is a secretion of the glands of the fourth or digestive stomach of the calf. It must be obtained from an animal at least a week old,

which is still living on milk alone. The glands are most active whilst digestion is going on, therefore the calf should be killed two or three hours after it has had a good meal. The rennet stomach or "vell" is then carefully removed and cleaned, but it must not be washed. After which it is salted and dried, ready for use. "Vells" keep best when tied up in bundles and hung in a dry airy place. To prepare the extract, they are soaked in warm water containing a little salt until the active principle is thoroughly removed from them. The extract is afterwards filtered, and salt and a little saltpetre are added as preservatives.

Formerly it was the custom amongst cheesemakers to manufacture their own rennet, but this is no longer necessary or advisable, as the commercial rennet is now in every way superior, being uniform in strength, free from taint, and of a much better keeping quality; good points which cannot, as a rule, be claimed for the home-made article.

Home-made rennet is still preferred by many makers for Stilton cheese, owing to the fact that as the commercial rennet contains a strong preservative, it cripples the growth of the mould, necessary in the ripening process. To obviate this, the American rennet prepared in tablets may be used for Stilton making, as it contains no preservative. Rennet should be kept in earthenware jars in a cool dark place, as it contains animal matter which is liable to putrefy. Its cost is about 10s. per gallon.

The cheesemaking season usually lasts ^{Cheesemaking season} from the beginning of April to the middle or end of September. The best cheese is made from milk produced by cows fed on grass. But when the pastures are insufficient, it is necessary to give such concentrated foods as decorticated cotton cake, bran, barley meal, and crushed oats in addition. A good cow produces on an average $4\frac{1}{2}$ cwts. of cheese during the season. On a cheese-making farm it is generally arranged as far

as possible to have all the cows calving in the spring, so as to obtain the largest supply of milk during the summer months. Milk selling is carried on through the winter. The returns from such a system as this cheesemaking and milk selling would be, per cow, somewhat as follows:—

4½ cwts. cheese @ 58s. per cwt.	£13	1	0
200 gals. milk @ 7d. per gall.	5	16	8
(out of cheesemaking season)			
Value of whey	1	0	0
	<hr/>		
Total value	£19	17	8
	<hr/>		

The
Acidimeter

To a large extent the success of cheesemaking depends upon the amount of acidity which is developed in the milk, whey and curd, at different stages of the manufacture. To ascertain this correctly, the acidimeter has been introduced by Professor Lloyd. It is specially intended to overcome the natural inaptitude which so many cheesemakers un-

fortunately possess, to estimate by the senses of taste and smell, the various degrees of acidity in milk, whey and curd, upon which the ultimate character of the product so much depends.

The acidimeter possesses the special advantage that the acidities as determined by it can be daily recorded as figures for future reference. By this means the maker is enabled to see the degrees of acidity he had attained in certain cheeses, which, when sold, were considered "too sweet," "too acid," or "just right," as the case may be, and act accordingly. The buttermaker also can ascertain to what degree of ripeness the cream should arrive before churning and thus be certain of a more uniform product. The principle of the acidimeter is that if an alkali and an acid are brought together they neutralise each other, or, in other words, they combine to form a salt. In this case the acid is lactic acid, and the alkali, caustic soda of a certain strength. To show when the exact point of neutralisa-

tion has been reached an indicator is required. For this purpose a chemical substance called phenol phthalein is used. It is colourless in acid and pink in alkali. The greater the degree of acidity present the more soda solution will be required to produce the pink colour that is to effect the neutralisation, and *vice versa*.

For the use of the acidimeter we require :—

(1) *Standard solution of caustic soda.* Soda is generally used, but any alkali, such as potash, lime, magnesia would do. By standard solution is meant a solution of which a known quantity will neutralise a definite amount of acid. In this case the standard solution is of such strength that one cubic centimetre neutralises .01 grammes, or 100th part of a gramme. (1 gramme equals the weight of 1 cubic centimetre of distilled water, at 4° C. 1 cubic centimetre equals the 1000th part of a metre.)

(2) *Ten cubic centimetres milk or whey*, or whatever is to be tested ; in all estimations ten cubic centimetres are used.

(3) *Phenol phthalein*, two or three drops.

(4) *A burette*. This is a graduated glass tube divided into twenty-five equal divisions, or cubic centimetres. Each cubic centimetre is subdivided into ten parts. Each large division denotes .1 of 1%.

(5) *A pipette* capable of holding ten cubic centimetres.

(6) *A porcelain dish*.

Method—The burette is filled to the top with soda solution. Ten cubic centimetres of milk, accurately measured in the pipette, are run into the porcelain dish, and two or three drops of phenol are added, and the dish placed on the stand under the burette. The soda is then run in very carefully, and stirred gently until a very faint crimson tint appears. The acid originally present in the milk has now been destroyed. The number of divisions of soda used is then carefully read and noted.

Thus, if two large divisions have been consumed to neutralise the acid in the milk, the percentage of acid denoted is .2.

In all estimations ten cubic centimetres of milk are used. If, therefore, these ten cubic centimetres of milk require two cubic centimetres of soda for neutralisation, then they contain $\frac{2}{100}$ of a gramme of lactic acid, and there would therefore be $\frac{2}{10}$ ths in 100 cubic centimetres of milk, or .2.

Cheeses are divided into three classes, namely **Hard Pressed**, such as Cheddar; **Blue Veined**, such as Stilton; and **Soft Cheese**, such as Camembert. By hard pressed cheese is meant one from which the whey is expelled by pressure; by blue veined that to which no pressure is applied, the whey being expelled by draining and evaporation. The chief varieties of these classes made in England are :—

<i>Hard Pressed</i>	Caerphilly	Dorset Blue
Cheddar	Wiltshire	<i>Soft</i>
Cheshire	<i>Blue Veined</i>	Camembert
Derby	Stilton	Pont l'évêque
Gloucester	Wensleydale	Coulommier
Leicester	Cotherstone	Port de Salut

In this article, it will be only possible to give the principles of manufacture of one of the leading varieties in each class.

Anyone who has thoroughly grasped the principles and system of making of one cheese in a class, and is *skilful in putting these principles into practice*, should be quite able to make any variety in the same class, allowing for the differences of detail.

Cheddar—It has already been said that *Cheddar* for successful cheese and buttermaking, we require the best milk from healthy cows, produced and kept in the most cleanly manner. In addition to this, we must have a suitable dairy (already described), containing all necessary apparatus. The larger utensils required for *Cheddar* cheesemaking are :—

(1) A jacketed vat or round cheese tub, made of tin, lined copper. Where a jacketed vat is used, it is easiest, and, in the end, most economical to have a boiler for generating steam. The “Standard” steam boiler

(of which an illustration has been given), supplied by the Dairy Outfit Company, will be found most satisfactory for this work.

- (2) A metal cooler and racks.
- (3) A curd mill.
- (4) One pair of American curd knives.
- (5) One platform weighing machine.
- (6) Three cheese presses.
- (7) Two tin weighing cans.
- (8) Acidimeter.

And, in addition, various things, such as strainer, breaker, whey syphon, rennet measure, stopwatch, weights, moulds, followers and wooden block, cheesecloth, thermometer, pails, etc. etc.

Cheddar cheese season begins in April and lasts till about the end of October. This cheese must be produced from grass, not from winter rations. It is made from a two meals' milk, that is, two milkings. The evening's milk is used to procure a certain amount of acidity. Before commencing the process of cheesemaking, it is necessary that the degree

of ripeness or acidity in the milk should be known. Although this should not have proceeded to such an extent as to give a distinctly sour taste to the milk, there should be a sufficient quantity of lactic acid developed at the start to enable the process in Cheddar making to be completed in not more than six hours.

Evening's milk—This must be refrigerated. ^{Evening's milk} In spring it is sufficient to run it over the empty refrigerator, in summer cool to about 60° F., and stir it frequently to prevent the cream from rising. Next morning the temperature of the milk is about the same as that of the surrounding air, and a certain amount of cream has risen to the surface. This is skimmed off.

The evening's milk is heated independently, and then mixed with the morning's, as the morning's milk is poured in, the cream at 90° F. is poured with it, through the strainer.

If the evening's milk is acid, the temperature is not raised at all, but the morning's

milk is heated higher to make up for it. When more than .28 of acid is present in the evening's milk, the idea of cheesemaking should be abandoned.

If it has coagulated, the whole milk may be churned.

Tests for
acidity

The two tests in common use are the rennet test, and the soda test or acidimeter, which has already been described. The rennet test depends upon the fact that rennet is assisted by acid, so that the length of time taken for coagulation depends upon the acidity in the milk.

For its use we require :—

4 ozs. milk at 84° F.

1 drachm of rennet.

Glass.

Straws.

Stopwatch.

Thermometer.

Method—Warm the glass, then pour in the rennet, and add two or three pieces of split straw about half to three-quarters of an inch

long. Place the thermometer in the glass, and pour in all the milk. Stir rapidly for ten seconds, then remove the thermometer. Directly the milk coagulates the straws should stop and reverse, usually at the end of about twenty-two seconds, which is then called a twenty-two second rennet test. The milk for cheese-making should give an acid test of from .21% to .22%, and a rennet test of twenty-two or twenty-three seconds.

If the milk is too sweet acidity must be Starter promoted by adding sour milk or whey. Milk which gives as much as a twenty-eight second rennet test is sweet, and should have about 2% of starter added. With a twenty-four second rennet test 1% is sufficient.

Rennet acts best at a temperature of about Setting 95° F., but the best results are obtained between 84° and 86°. If milk is set at a high temperature, the fat has a tendency to separate, but at 85° (the usual temperature), we obtain a fairly rapid coagulation without injuring the fat. The setting temperature

also depends to a certain extent on the quantity of the milk.

A large body retains its temperature and acidity better than a small one. Rennet is usually added in the proportion of one drachm to three gallons. This is mixed with four or five times its volume of cold water, and should be well stirred into the milk for from three to five minutes. After this, the stirring should only be done very lightly on the top, so as to prevent the cream rising, until signs of coagulation are noticed, which is first shown by a slight thickening of the milk.

The vat must then be covered over, and the milk allowed to remain perfectly quiet while the process of coagulation is going on. As soon as the coagulation is strong enough, the curd may be cut. This may be ascertained by gently inserting the finger and raising it slightly, and when ready the curd will break clean across and show signs of draining.

Coagulation should be complete in about forty-five minutes from the time of adding the rennet.

This is done to ensure the expulsion of ^{Cutting} the whey, and the thorough contraction of the casein. Great care should be exercised in cutting the curd, which is extremely tender at this stage, otherwise a great loss of fat will be the result. It is cut twice with the horizontal knife, and twice with the vertical. These knives consist of a number of steel blades arranged in a frame; in the one case the blades are placed horizontally, and in the other vertically.

The horizontal knife is usually put through first in a longitudinal direction. These knives cut the curd into cubes about $\frac{3}{8}$ of an inch in diameter, though the size of the cube is regulated somewhat according to the amount of acidity present. Curd in which there is much acidity is cut smaller than a sweet one. After cutting, allow the curd to stand for from two to three minutes, so that each little

cube has time to shrink and harden on the outside, which prevents the loss of fat. As soon as the curd is cut, it should be gently stirred for about twenty minutes before scalding is begun.

Scalding Scalding has a twofold object :—

1. The contraction of the curd and the expulsion of the whey.

2. To promote acidity.

It is imperative that the scalding should take place evenly throughout the whole mass, and to this end the curd must be constantly stirred and the heat applied very gradually, about 1° in every $2\frac{1}{2}$ minutes from the setting point of the milk up to about 100° F., according to circumstances.

Directly heat is applied to curd, it parts with its whey and contracts, and as the particles shrink and harden, stirring may be done more energetically without loss of fat. When using a jacketed vat and heating by steam, it is necessary to turn off the steam about 3° before the required temperature is

reached, as the heat that the vat itself contains will raise it sufficiently.

If an ordinary round cheese tub is used, scalding will be done by the use of hot whey, and the temperature must be raised in three stages—first to 88° F., then to 92° F., and finally to 100° F. Scalding by hot whey is done by taking out a certain quantity of whey, heating it, and returning it to the vat. Any quantity may be taken out, and in order to know to what temperature this should be brought so as to raise the contents of the vats the following formula is used:—

Multiply total number of gallons in vat by the degrees it has to be raised, divide by the number of gallons taken out, and add result to the temperature of the vat; *e.g.*, if the total number of gallons in the vat amount to thirty gallons, and four gallons have been taken out—

*Formula for
ascertaining
to what
temperature
the whey
taken out
must be
raised*

$$30 \times 4 = 120 \div 4 = 30 + \text{temperature of vat, say } 84^{\circ} \text{ F.} = 114.$$

Stirring may be continued for a short time

after the desired temperature has been reached, and then the curd may be allowed to settle or "pitch," until the particles have contracted to about half their original size, and become "shotty," *i.e.* hard enough when pressed between the fingers to fall apart when the pressure is relaxed, exhibiting no tendency to stick together.

After the curd has settled long enough (somewhere about forty-five minutes) to ensure the proper consistency of the curd and the right amount of acid, the whey may be withdrawn.

In dealing with acid curds, it will be necessary to remove part of the whey either just after cutting (when very acid), or after the maximum scald is reached, leaving just enough whey to float the curd till it is sufficiently dry.

The whey contains the milk sugar which is the cause of the acidity.

From the time of cutting till the whey is drawn acidity develops from .14% to .18%.

Just before drawing the whey, a wooden rack and weights are put on for a few minutes to solidify the curd, and the whey is then drawn off, after which the curd is cut down the centre, and if the quantity is small, say from about thirty to forty gallons of milk, it may be rolled up immediately to the other end of the vat. In dealing with larger quantities, the curd should be cut down the centre, and then across into square blocks, and left spread out to drain for a few minutes. The blocks should be pushed on either side, leaving a channel down the centre to allow free drainage for the whey. They are then piled upon each other, two or three deep, covered with a clean cheese cloth, and the rack and weights put on again to expel the whey.

At first, about every twenty minutes, the curd is uncovered and turned, the parts which were uppermost being placed inwards; subsequently the development of the acidity must regulate the turning and treatment of the curd.

Acid curd must be frequently opened out and turned, to hasten on the drying process before the acid has developed too far. Sweet curds are kept warm and disturbed as little as possible. During this process of "matting" the development of the acidity causes a considerable change in the condition of the curd. It becomes elastic, smooth, and, when torn apart, distinctly stringy, and has an acid smell. When the curd contains from .75% to .80% acid, it is ground in the curd mill, and salted in the proportion of 1 oz. salt to 3 lbs. curd; the salt must be very well stirred in.

It is then filled into the moulds lined with a clean cheese cloth, and put in press, at first with only the weight of the screw.

The temperature of the curd when put in press should not be above 75°. If too warm, the fat is liable to be pressed out and lost. After two or three hours, the pressure may be increased to about 6 cwt., and left so overnight. The following day increase

pressure up to 10 cwt., ending finally by from 16 to 30 cwt., according to the size of the cheese.

The pressure should be uniform, and, if possible, continuous; the best cheese presses are those with which the pressure follows the cheese as it shrinks. Where screw presses are used, the screws should be tightened as they become loose.

The morning after going to press, the cheese must be taken out, turned, and have a clean cloth put on, and the following morning the process is repeated. On the third day the same thing is done again, and a capping of unbleached calico is put on one end. The next day it is capped at the other end, and put back into the press for a few hours.

It may then be taken out, well greased, bandaged, labelled, and removed to the ripening room.

When the cheese comes from the press, it ^{Ripening} should be taken to the ripening room to be

kept at a temperature between 60° and 65° , where a series of fermentations take place, during which the casein becomes soluble, and the cheese acquires the peculiar and characteristic flavour necessary.

Many investigations have been carried out with regard to this subject of cheese ripening, but even now it is very imperfectly understood.

As far as has been ascertained, the different constituents seem to undergo the following changes:—

Fat.—This seems to undergo very little change in ripening.

Water.—The percentage of water becomes distinctly less.

Casein.—The most important constituent in the cheese is changed from the insoluble condition in which it is found in fresh cheese to certain soluble albuminoid bodies.

Sugar is no longer present in ripe cheese. It has been decomposed into lactic acid, and probably butyric acid.

Mineral Constituents.—Some of these, especially lime and phosphoric acid, are lost by passing away in the salt during the salting of the cheese. So far it has not been ascertained how the mineral salts are affected by bacteria during the ripening process. Professor Lloyd considers that “the principal factors in the ripening of cheese are the continued production of lactic acid, together with an increase in the solubility of the casein or nitrogenous compounds; as the casein becomes soluble there is an increase of ammonia, and of substances like ammonia probably produced by the decomposition of the casein, which is converted into peptones.”

Richmond agrees that the lactic acid bacteria has some influence, but holds that as the cheese ripens concurrently with the growth of the lactic acid organisms, and continues, while they are diminishing, that the ripening is not due to the direct action of micro-organisms.

Cheese ripens best when the process goes

on gradually. It proceeds much more rapidly in a high temperature, but the best quality cheese is produced when ripened at a temperature between 55° and 60° . According to recent experiments carried out, it has been found that although it takes longer to ripen, 40° F. produces excellent results.

At the end of about a month or six weeks the cheese would be fairly fit for eating, but it will not be perfectly ripe for from three to four months. As soon as a cheese is ripe, it should be used, as although it may be kept for some time afterwards, the quality deteriorates.

Cheddar Good Cheddar usually fetches from 56s. to 60s. per cwt. One gallon of milk is usually taken to produce 1 lb. of cheese, but this is found to vary with the season of the year and the breed of cow.

Wensleydale *Wensleydale*.—This cheese is chiefly made in Yorkshire, in the Wensleydale valley, and there are many different systems of making it. The land on which it is produced lies

on limestone, the soil is light and stony, producing sweet, fine herbage. There is also an abundant supply of pure water, and in this district most of the cows are milked outdoors.

Wensleydale is becoming increasingly popular in London, and good prices may be obtained. Its good points are that it keeps better than Stilton after being cut; its flavour is not so much impaired by mites; there is not so much waste in cutting, and it retains its moisture better. In its own district it is made all through the winter, but the cheeses are then made of a different shape, being flat and round, and are called "flat Wensleydales." These cheeses are sold at the end of a fortnight to buyers in the Newcastle district, who distribute them chiefly among the miners at 7d. a lb., and this really pays better than the summer cheese. For making, an ordinary Cheddar vat is required. Wensleydale is made from ripe milk,—morning's and evening's milk is preferable to sweet milk ripened with starter.

The amount of rennet used to produce coagulation in about $1\frac{1}{4}$ hours is one drachm of prepared rennet to five gallons. If only a small quantity of milk is used (fourteen gallons), one drachm rennet to four gallons should be taken. The curd should be longer in forming and softer than Cheddar. Cutting should be done with the American knives, but not in such small particles as for Cheddar making. The cubes should be something between the size for Cheddar and Cheshire cheese, although this must be regulated to a certain extent by the acidity in the curd. After cutting, let it stand for a few minutes, and then stir for thirty minutes, after which it must be scalded to 88° F. with hot whey. After scalding, under normal conditions, allow the curd to settle, but where the milk is acid, it should be continually stirred in order that too much acid may not be produced until the curd is sufficiently dry. The whey should be drawn when it contains .17 of acid, the curd is then removed to the cooler, with just

enough whey to barely cover it, till .18 to .19 of acid is developed, when the whey may be withdrawn and the curd left to drain.

About an hour before vatting, it should be cut up, in good sized pieces, and turned over now and again to facilitate drainage. It may be vatted when the acidity has reached .3%. The amount of curd from fourteen gallons of milk is about 24 lbs. When putting into the mould, the large pieces should be placed in the centre, so as to encourage the growth of the mould in ripening. Salt is added in the proportion of 1 oz. to 4 lbs. It stands for three hours after vatting without any pressure at all, when it should be turned and placed in press, and left there overnight with about 2 cwts. pressure. Next morning the cheese should be taken out, turned, and put back till about midday, when it is finally removed from press and bandaged. A circular bandage all in one piece is used. The whey from the cheese soaks into the bandage, sticking it

firmly to the side of the cheese, and so preventing the entrance of the cheese-fly. It should be placed on a stone shelf or slab till the outside of the cheese is dry, and afterwards should be kept in a cool, dry place at a temperature of 60°. Ripening takes about five months, and the weight of cheese from fifteen gallons of milk when ripe should be about 14 lbs. They are mostly made in truckle shapes. On cutting through a ripe Wensleydale it should have an appearance similar to Stilton, except that the blue mould is supposed to perforate more than in Stilton, hence they are often slightly discoloured. In flavour, while it approaches a Stilton, it is rather sweeter and moister, with a trace of the flavour found in hard-pressed cheese; it is, in fact, something between a Caerphilly and a Stilton.

SOFT CHEESEMAKING

This branch of cheesemaking is not developed so much as it might be. It is

quite true that at the present moment it is not well known in England, though, fortunately, in this respect things are improving; but it is also equally true that up to now no very high standard of excellence has been attained in its manufacture.

1. English farmers have never studied the art of making it, though in many cases it would pay them better than selling milk at 6d. a gallon, out of which they have to pay 1d. or $\frac{3}{4}$ d. a gallon carriage. It is undoubtedly an industry for women to take up and to succeed in; in fact it awaits development at their hands.

One very often hears the objection raised against cheesemaking that it is such heavy work, and when one thinks of the manufacture and subsequent daily turning of 60, 80, or 120 lb. Cheddars, it *is* heavy work. In the case of soft cheeses it is different, the work is light, fascinating and dainty, infinitely more interesting than buttermaking, which is undoubtedly a case of "the trivial round, the common task."

Then, again, there is no expensive plant to be set up. All that is required is an ordinary, average size dairy, and a room for ripening the cheeses in, in both of which there must be a means of regulating the temperature, either by stoves or pipes. If possible a cellar which can be well ventilated is the best place to ripen these cheeses in. Where the dairy is already in existence a sum of £5 would buy everything required to start in a small way, making three or four different kinds of cheese.

The following is a list of things which would be required, with their prices. They can be got from any large dairy firm:—

A draining table, these can be had from 10s. to 35s., according to size.

	£	s.	d.
Two oak tubs for renneting the milk, 12s. each	1	4	0
1 Dozen draining boards	0	6	0
6 Dozen straw mats	0	12	0

The cheeses are drained upon straw mats

placed on these boards so that they can be moved and turned.

	s.	d.
Rennet measuring glass .	1	6
Papers for lining moulds, 1000	3	0
1 Dozen Pont l'Evêque moulds	4	9
„ „ Gervaise moulds .	3	3
„ „ Bondon „ .	3	6
„ „ Coulommier „ .	8	0

2. There are many varieties of soft cheese, of which the best known are Camembert, Coulommier, Pont l'Evêque, Gervais, Bondon, and of course the ordinary English cream cheese, which practically anyone can make almost anywhere, and which sells for nearly double the value of the cream used.

Camembert is a variety very largely made and appreciated abroad. It has been made in England on a small scale for some time, but unfortunately no one as yet has succeeded in obtaining the characteristic flavour and consistency of those made at their own home

in Normandy. Apart from Camembert, however, there are many of the other varieties which can be made as well here as in Normandy, Brittany, or Switzerland. Pont l'Evêque, for instance, always sells well, having a very delicious flavour. It takes about six weeks from the time of making till it is ready for market.

Gervais and Bondon rather resemble each other; they are smaller than Pont l'Evêque, and do not take such a long time to ripen. Gervais is fit for sale at the end of three days.

Coulommier is also a very favourite cheese, besides being easy to make and profitable to sell.

Cream cheese Set thick sweet cream without rennet at 58° to 60° F. Put into a linen cloth and hang up or place over a rack in a good current of air. Scrape down the sides of the cloth, and change it occasionally to assist drainage, until the cheese is firm enough to mould. Moulds are generally $2\frac{3}{4} \times 1\frac{1}{2}$ ins.,

and hold about $\frac{1}{4}$ lb., but the cheeses can be made of different shapes or sizes to suit customers. Line the boxes with grease proof paper or with muslin. These cheeses are usually made without salt, but if preferred it can be added to the cream in the beginning. One pint of cream will make three $\frac{1}{4}$ lb. cheeses.

Cream cheeses this size are usually sold at 6d. each.

One third cream and two thirds new milk. *Gervais*
Mix thoroughly and set at 60° to 65° F. Add one or two drops of rennet per quart, and stir at intervals until it shows signs of coagulation. In from twenty-four to thirty-six hours ladle into a huckaback cloth, place over a rack, and twenty-four hours afterwards change the cloth and press between two boards, with a slight weight on top. Add salt if desired. Moulds are $2\frac{1}{4} \times 1\frac{3}{4}$ ins. Line with paper specially prepared. Three quarts will usually make one dozen cheeses.

One gallon of new milk, $\frac{1}{2}$ pint buttermilk. *Bondon*

Set at 60° to 65° F. Add two drops of rennet per quart, and stir for a few minutes. In from twenty-four to thirty-six hours ladle into a huckaback cloth placed over a rack and drain for from eight to ten hours. Scrape down the sides of the cloth occasionally to assist drainage. Then turn into a clean cloth, and press between two boards under a weight of about 14 lbs. Add salt to curd when firm. Moulds $2\frac{3}{4} \times 1\frac{3}{4}$ ins. Line with grease-proof paper. One gallon average milk will make six or eight cheeses.

Pont
l'Evêque

Three gallons of whole milk set at 95° F., one drachm of rennet; stir for three or four minutes, and then again in ten minutes.

The time taken for coagulation is about twelve minutes. From coagulation till the curd is firm enough to cut and put into cloths is about one hour. The curd is then cut in three directions, down, across, and corner-wise, and ladled into two cloths. The same amount of curd should, as nearly as possible, be put into each cloth, as drainage is then

more even. Next gather up the corners of the cloth, leaving one corner to wrap round, at first quite loosely. Tighten it a little in about fifteen minutes, and again at the end of the next fifteen minutes. Cut the curd again in the centre and leave for fifteen minutes. Then tighten the cloth and turn the curd over, leaving it for twenty minutes. If necessary the curd must be cut and the cloth tightened once more; leave for ten minutes; after which it ought to be ready to fill into moulds. When filling moulds lose no time, being careful to fill the corners well. After filling, the cheeses should be turned over two or three times about every five minutes. Next day scrape the edges with a knife and salt the top, the day after turn over and salt on the other side. The sides must also be well salted. They should be ripe in about six weeks.

In working up a market for these cheeses, it would be advisable to make several varieties to start with, until it is ascertained which

sell best in the particular locality, then specialise in those one or two kinds and get up a reputation for them. It is an excellent thing, when possible, to get the custom of a hotel or a club, as soft cheeses are often much used there. There is no reason why one or two energetic and capable girls, *provided they have had a thorough training in dairy work*, should not take up this work and make a good and pleasant livelihood. If they can supplement it by poultry and bee-keeping so much the better. A certain amount of capital would, of course, be required to start with, but for the kind of place meant—a small cottage and land enough for four or five cows—the amount would not be anything considerable. Where the time and money can be spared a visit to the farms and dairies of Normandy and Brittany would be of incalculable benefit to anyone thinking of taking up this branch of dairy work.

BYE-PRODUCTS

The chief bye-products of the dairy are :—

Skimmed milk	Milk sugar
Separated milk	Whey butter
Butter-milk	Skim milk cheese.
Whey	Dried casein.

To obtain the best monetary results from a dairy, it is necessary that these bye-products should be advantageously used.

With regard to the first four, they are generally utilised as food for animals, for which they are extremely valuable.

Separated milk is best for this purpose, ^{Separated milk} because it can be given perfectly fresh and sweet, differing only from whole milk in having had its fat removed. This may be replaced by something less costly than butter fat, as, for example, linseed oil or cod-liver oil, and the result is a food equal to new milk.

Near a town there is often a demand for

separated milk at about 1d. a quart. On the farm it is only valued at 1d. per gallon for feeding young stock.

Skimmed milk *Skimmed milk* is preferred by many, owing to the larger amount of fat which it contains, but it is not so good for feeding owing to its having developed a considerable quantity of lactic acid. Sour milk causes diarrhœa and derangement of the digestive system in young stock.

Butter-milk *Butter-milk* is an excellent food for pigs, but as it is sour it is best not to give it to calves.

Whey *Whey* is less valuable than separated milk and buttermilk, as it has lost not only the fat but a large proportion of the casein.

Whey butter *Whey butter*.—In cheesemaking districts this is often made. The whey is allowed to stand until all the fat has risen, and it is then skimmed and made into butter in the ordinary way. It is usually only made for home consumption.

Milk sugar *Milk sugar*.—At one time it was a difficult

and expensive matter to separate this sugar from the different constituents of the whey, but now that there are various methods of doing so, the manufacture of this sugar is carried on on quite a considerable scale. It is the most digestible form of sugar, not so sweet as the ordinary cane and beet sugars, and largely used in the preparation of invalids' and infants' foods.

Skim-milk cheese.—The best known example of this is the cheese made in Dorset from skim or separated milk, called “Dorset Blue.” It is a very favourite commodity in its own locality. It belongs to the class of blue veined cheese, and ripens very much like a Stilton. It is usually sold at about 4d. a lb.

Dried casein.—In some dairies, instead of using the skim or separated milk for feeding, the casein is extracted from it, and sold in the form of a fine white powder.

Process.—The milk is treated with acids, which precipitate the casein, after which the whey is drawn off and the curd washed with

water. It is then taken out, pressed and afterwards ground in a mill and finally dried in the oven.

TRAINING

There is a very prevalent idea amongst many people, and, unfortunately, especially amongst women (though they are beginning to improve in this respect) that work, such as dairying, gardening, poultry and bee-keeping, may be taken up with next to no knowledge of the subject.

Why this should be so, it is hard to see. It is usual in all other walks of life to learn the business at which one proposes to work, and why should not the same course be followed with regard to farming or any other of the lighter branches of agriculture? The writer is acquainted with a lady (typical of many others), who, after taking a six weeks' poultry course, insisted, in the face of great opposition, in starting a small poultry farm. All the conditions were

satisfactory, house, ground and market, *but* the lady was untrained. She had no experience beyond her six weeks' course, so that when difficulties and contingencies arose, which had not been mentioned in her course, and on which she had no "notes," she was quite unable to cope with them.

She has now joined forces with those who find "that poultry keeping does not pay."

No other business or profession embraces such a wide area of knowledge as farming: some idea of this may be gathered from the few points touched upon in this chapter.

Forethought, patience, prompt judgment, love of nature, and last, but far from least, Necessary qualities for a farmer sound, practical experience of the work in all its branches, is demanded of the successful farmer.

The practical experience *must* be there, and he or she may, if they like, be with advantage and enjoyment, botanist, entomologist, geologist, chemist, zoologist, and meteorologist.

Surely no profession embracing so many "ologies" is to be lightly taken up!

From the point of view of a woman wishing to take up dairy farming and having no previous knowledge of the subject, the question of the most satisfactory method of training is most important.

For those who really intend to take it up seriously, either to work for themselves or to become teachers of dairying, two years is the shortest time which should be devoted to it.

The first year may be given to the scientific part of the work, combined with a certain amount of practice; the second year, the order of things to be reversed, with a large amount of practice and very little science.

Where it is possible the best results are obtained when the scientific and practical farm work and dairying can be carried on side by side, otherwise all or part of the second year should be spent on a well arranged dairy farm, where the student may

enter fully into all the daily routine of farm life.

Anyone, absolutely ignorant of dairy farming, going straight to a farm will not obtain nearly such good value for their money, as one who has already some knowledge of the matter, though perhaps as far as the actual farming goes, it is chiefly scientific. They are then in a position to take advantage of and understand all the work which is going on.

Farmers are busy, hard-working men, and do not, as a rule, profess to teach farming, though they may be quite willing to receive farm students who wish to have the opportunity of putting their theories into practice.

OPENINGS

The three following objects may be in view at the end of a course of training in dairywork:—

1st. To enable those who have the neces-

sary capital to work a small place of their own.

2nd. To obtain posts as dairy managers or dairymaids.

3rd. To become lecturers or teachers under the county councils.

The first mentioned is undoubtedly the most interesting termination. There is no reason why energetic and capable women should not take up dairying and make a good and pleasant livelihood, provided they have had a thorough training in all its branches, otherwise it simply means failure for themselves and probably the discouragement of others, who perhaps have all the necessary qualifications for making a success of it.

Nevertheless they should be prepared for the fact that it will be a case of hard work, early rising and constant attention. Animals pay no heed to Sundays, high days or holidays. Therefore anyone embarking on work of the kind must be ready to give all their time and energies to its development.

In any case, whatever drawbacks there are, they are more than counterbalanced by the all absorbing interest of the work.

There is not the same demand for dairy managers and dairymaids as for gardeners and poultry managers, that is to say, for girls of culture and refinement, for whose benefit this article is intended. Lady gardeners and poultry women are of comparatively recent date, and they have, so to speak, made their own position. On the other hand, the dairymaid has been with us from time immemorial, and she is usually expected to fill up her time by taking some share of the house or laundry work with the other servants, amongst whom she is classed. Naturally positions such as these are not tenable by ladies, so that practically in dairy work, at the moment, the openings resolve themselves into small independent holdings, or posts as lecturers and teachers. For the former, there are many good appointments under the county councils at salaries ranging from £80 to Posts to be obtained

£150, and, in some cases, board, lodging and travelling is included. It is necessary, however, to obtain these posts, that the applicant should possess all the highest dairy certificates.

POULTRY KEEPING FOR
UTILITY & EGG PRODUCTION

CHAPTER III

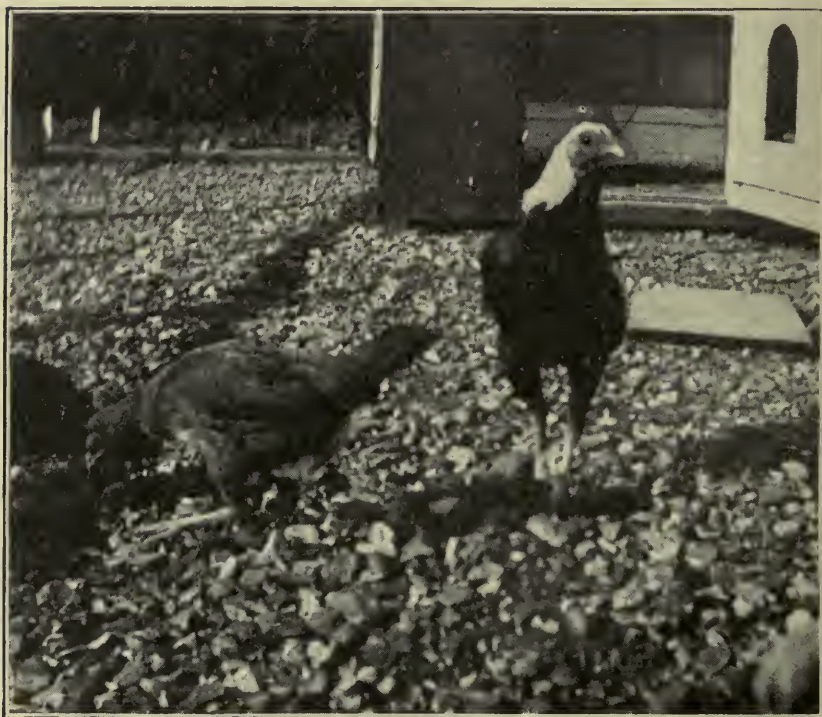
POULTRY KEEPING FOR UTILITY AND EGG PRODUCTION

THE subject of poultry keeping from every point of view has been so thoroughly dealt with in books and magazines by experts, that it would seem unwise and unnecessary to treat it in a technical way in this short chapter. I propose, therefore, to give in more or less detail a practical experience in poultry keeping, which has come very nearly under my own observation, and which strikes me as being one of such ordinary occurrence that the relating of it may be a help to "those who are about to start" for themselves.

By way of general remark, however, I would say that the ideas of the every-day public on poultry may be roughly classified

Two views
of poultry
keeping

into two sets, viz., those who only think of poultry as any sort of two-legged bird that

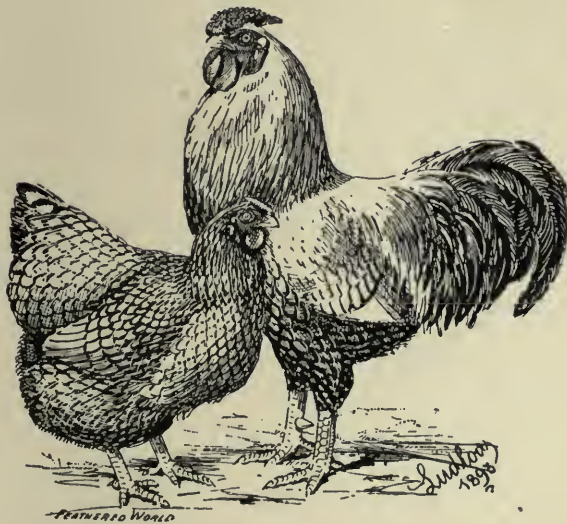


Lady Warwick Hostel—A Prize Indian Game-Buff Orpington Cock

lays eggs for table and runs about a farm or field “on its own” (so to speak), and therefore requires so little looking after, that it is futile to *train* anyone to do so simple a thing.



Plymouth Rocks



Silver and Golden Laced Wyandottes

The other class thinks of them as more or less valuable birds in pens—both for table or fancy, and therefore entailing such care and constant attention as to be rather beyond a woman's scope to manage.

In point of fact a happy medium between the two extremes will perhaps bring about the position which poultry keeping should take amongst the "Lighter Branches of Agriculture" if it is to be successfully carried out.

Utility, not
"fancy"

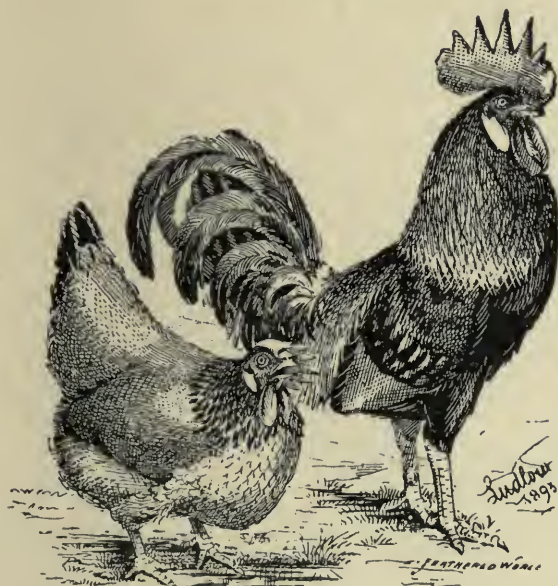
It should be clearly understood that in this chapter only the treatment of it from a utilitarian point of view is attempted. "The Fancy" has fascinations of its own, and ramifications endless and illusive, which require considerable capital to gratify, with a large proportion of the speculating instinct which ordinary women do not possess—as a rule—and, alas! a conscience which must not, at least in some cases, be over sensitive.

How to start

Now let us suppose that someone wanted to start poultry keeping on a portion of ground taken from an ordinary garden. The



Buff and Black Orpingtons



White and Brown Leghorns

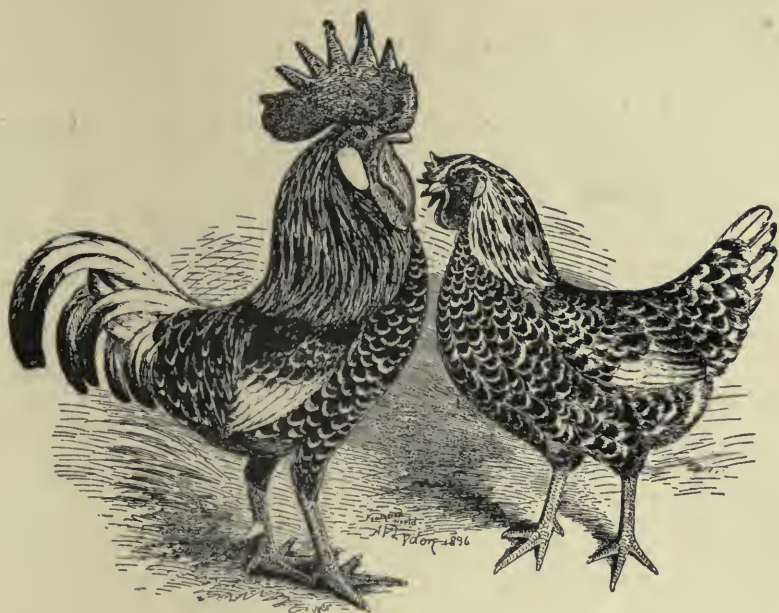
first thing to be considered is what breed or breeds to get, and how many birds to keep on the ground allotted. The person to whom I have referred started with two breeds, viz., Buff Orpingtons and Houdans; the former because they do well on a gravel soil, and are excellent layers and sitters, and generally speaking are all-round favourites; the Houdans, because they were presented; they did very well indeed as good egg layers, and for table, especially when crossed with other breeds. As the question of breeds is a most important one to decide before starting poultry keeping the following advice given by the well-known poultry expert, Mr Geo. Palmer, in one of his lectures, may prove helpful.

Different
breeds

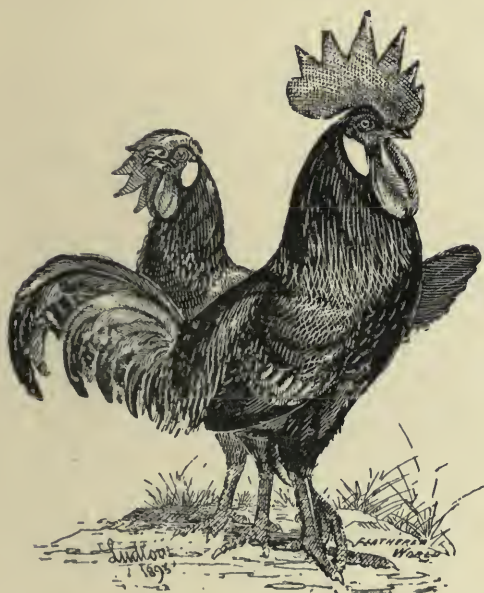
The best non-sitter for grass runs—White Leghorn.*

The best non-sitter for small covered runs—Black Minorca.

* The blocks for illustrating the different breeds have been kindly lent by Mr Randolph Meech.



Anconas



Black Minorcas

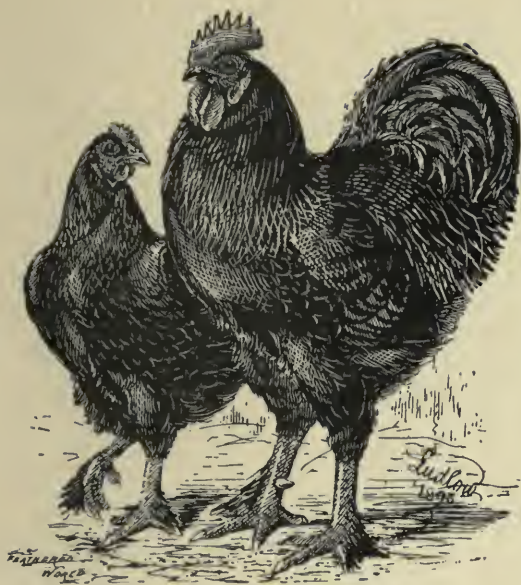
Other good non-sitters — Andalusian, Ancona, Redcap.

Best sitters and layers of brown eggs in order named—Silver Wyandotte, Buff Rock, White Wyandotte, Buff and Gold Wyandottes, Buff Orpington, Barred Rock, Langshan.

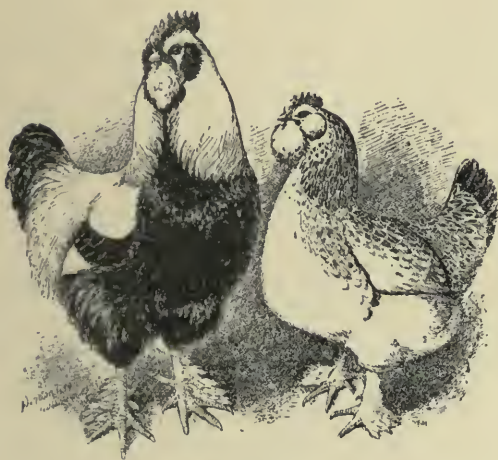
In considering table fowl for size, quality and rapidity of growth Mr Palmer places first, the first cross from Indian Game and Dark Dorking Hen, and when quality only is required substitution of an English Game Cock for the Indian. Faverolles are also a very good breed.

Breeds for
localities

When, however, the object is to combine as many good qualities as possible, that is to get from the pullet the largest number of eggs, and from the cockerel qualities for table, a first cross gives the best results—as, for instance, Houdan-Leghorn, Houdan-Minorca, Houdan-Ancona, Barred Rock-Leghorn, Langshan-Minorca. Now, however, that the county councils have made instruction in poultry keeping one of their regular



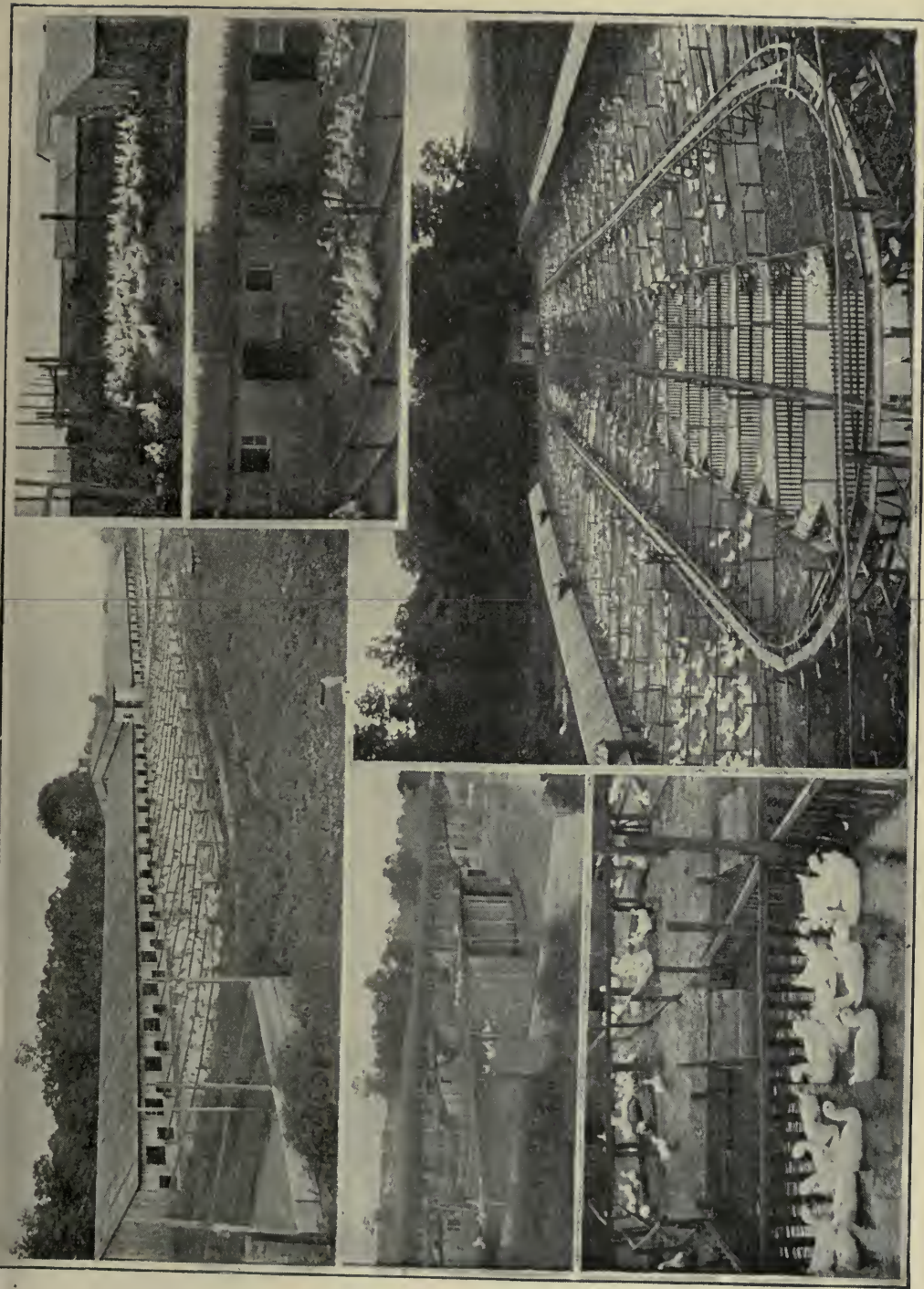
Langshans



Faverolles

subjects, it is easy to obtain the advice of an expert as to particular breeds suitable for the particular locality or conditions, and this advice it is always well to have before starting.

Housing Then comes the question of housing, which of course is most important and many-sided. As a rule poultry always spoil the look of a place, and are a disfigurement to any garden, because the runs and houses are nearly always utilitarian to the last degree, if not positively ugly, whilst if the birds are at large they scratch and trample down everything, especially the choicest seed beds. One lady of my acquaintance suffered much from the poultry which her husband delighted in, but the care of which fell largely to his wife, as he was away all day at his business. She was devoted to her garden, and kept it in good order, but little by little the chicken runs encroached and encroached, and then it was all runs and no garden, combined with many searchings of hearts, and not a little sadness.



Photographic Views of Oxford Poultry Farm, Oxford, Pa., U.S.A.

There is of course a movement on foot to introduce new appliances of every description both elaborate and simple. Needless to say the impetus has largely come from America. The Anglo-American Poultry Company and Cyphers Incubator Company may be specially named, as having introduced improvements likely to revolutionise the poultry industry. ^{Improved appliances}

Figs. 1 and 2 give the Cyphers Duck and Broiler Plant at Wayland, New York, near Buffalo. "It consists of a 300-foot brooding house of the latest pattern, heated by hot water and regulated by a Cyphers electric regulator." It is stated in the catalogue that "during the past four years thousands of pounds of green ducks, broilers and roasters have been produced and sold." Of course this is all carried on, on a truly American or "mammoth" scale, which is quite beyond the scope of ordinary people, as an immense capital is necessarily required. "Broilers" is the American name for young "Broilers" birds from five to six weeks old, which are

“picked up,” plucked and trussed, split open and broiled like a mackerel. They are very delicious if nicely cooked and served hot, as they possess much more flavour than the mature chicken. They are just a step beyond the “Petits Poussin” stage and the ordinary birds used for table. “Petits Poussin” Petits Poussin are three-week old chicks, which are reared in enormous numbers, especially around Paris, for the supply of the restaurants, where they obtain a ready sale. There is a certain demand for these also in London, but unless reared in great numbers, for which special plant has of course to be erected, the prices are not good enough to make it a popular branch of poultry keeping in England.

The poultry houses made by the Anglo-American Company appeal to the public for their utility. Fig. 3 is a cheap match-boarded house, easy to make at home. The perches run across and form handles by which it can be moved. Fig. 4 shows a portable Scratching Shed House. Scratching



2,300 CHICKS.
2,300 DUCK & BROILER.
CYPHERS PLANT.

Fig. 1

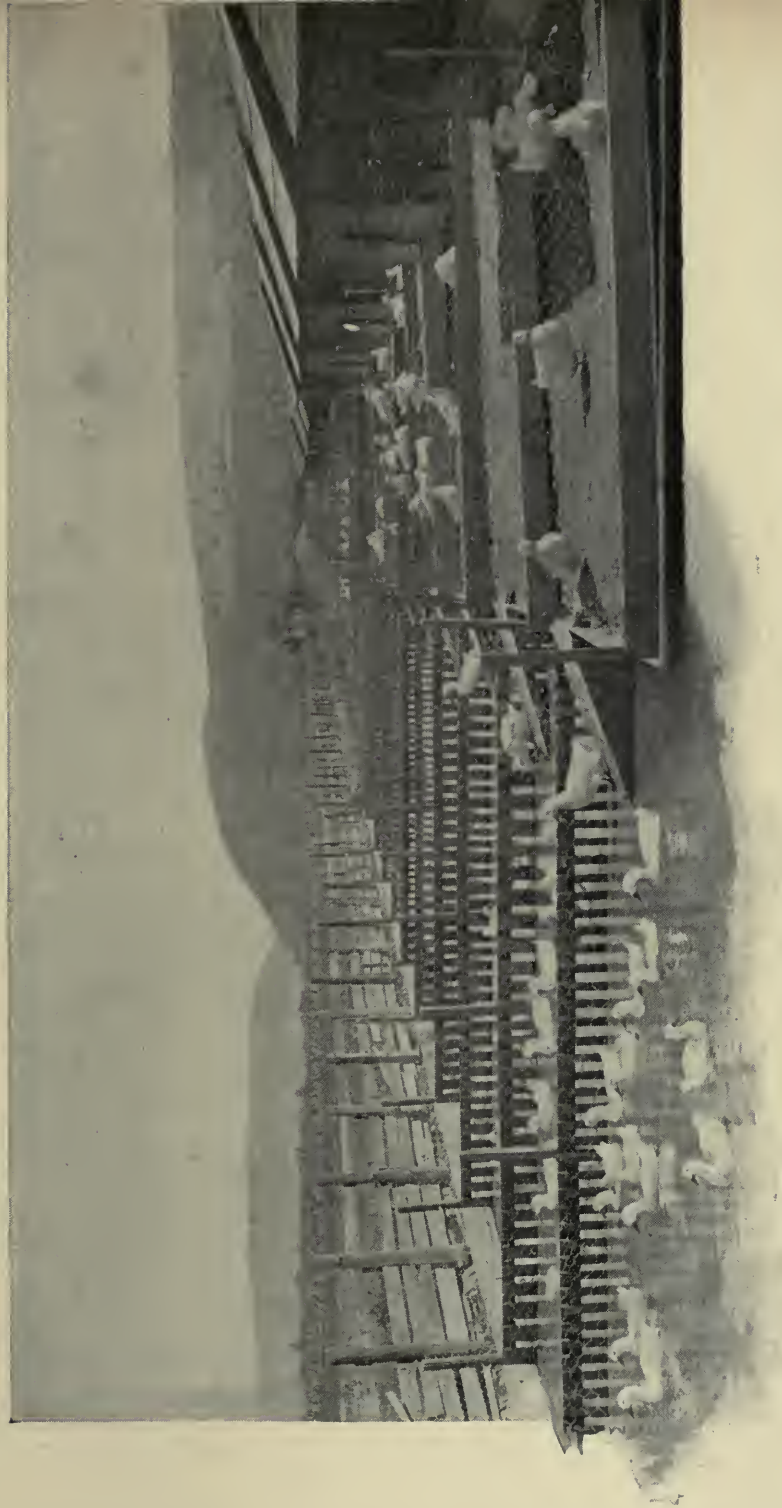


Fig. 2.—Photographic View of Breeding Pens and Swimming Pools for Ducks on Cyphers Duck and Broiler Plant

sheds are for the purpose of keeping the birds under shelter, and yet giving them plenty of occupation by scratching in the straw and litter for food all day, on the "dry feed" system. It has been found to work admirably.

Mr Geo. Palmer has evolved a patent plan ^{Combined garden and poultry run} for combining a garden and chicken yard, which would certainly commend itself to what is described agriculturally as "a small man," and therefore would equally apply to "a small woman." Supposing the garden is, say an acre in extent, a little piece may be reserved for flower beds and paths, and in fact it may thus be permanently laid out; then the remainder can be divided into four, with the poultry house in the middle, and a path leading up to it on both sides. The birds can be let out into the grass run to start with, whilst the other sections are prepared for crops in rotation, commencing with peas and beans. When these come off the ground, the birds can be moved in to that section, and

so on until they have worked right round. This plan answers two purposes, it prevents the fowl run being tainted, and the manure on the ground with cultivation has a splendid effect upon the crops. Mr Palmer quotes a lady in Warwickshire who has adopted this plan and made it pay admirably.

An ideal
poultry farm

As an exception to the many poultry farms I have visited from time to time, I would mention a really picturesque one which I saw in France, at Mantes. It was a happy combination of a well laid out garden and orchard, with pens of poultry on sound utility lines. Perhaps I may be forgiven if I quote the description of this farm which I wrote at the time (Aug. 1901) for the *Women's Agricultural Times* :—

“Across the road was a pretty garden and large orchard, and here, dotted about in picturesque houses and small runs (the floors of the houses, being raised about 18 inches from the ground, acted as a shelter) were the breeding pens. Sand was scattered over

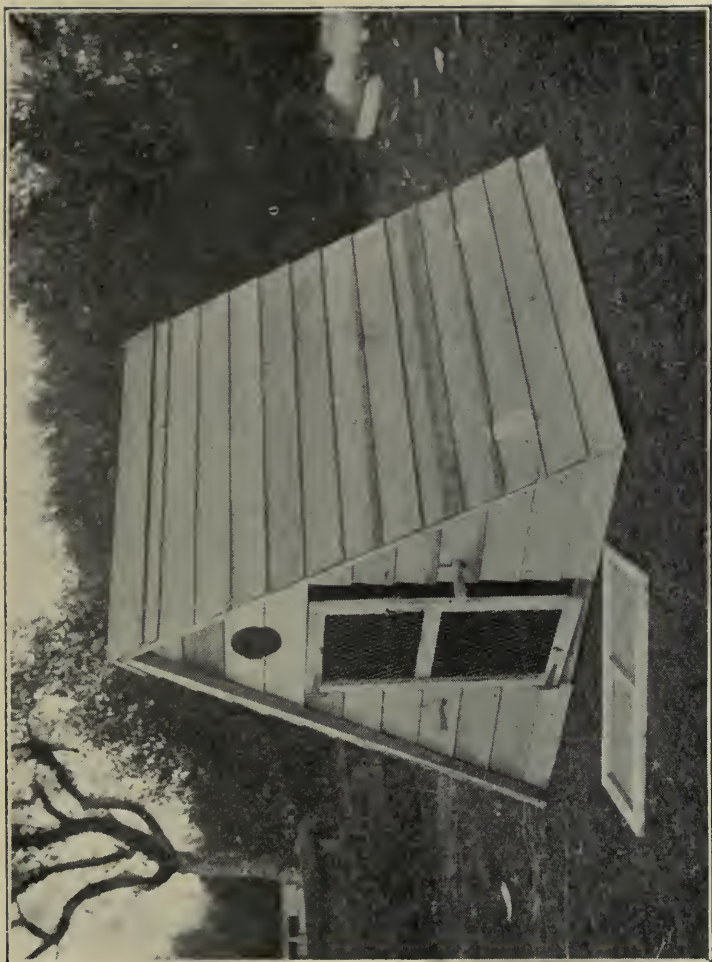


Fig. 3.—A Cheap Apex House

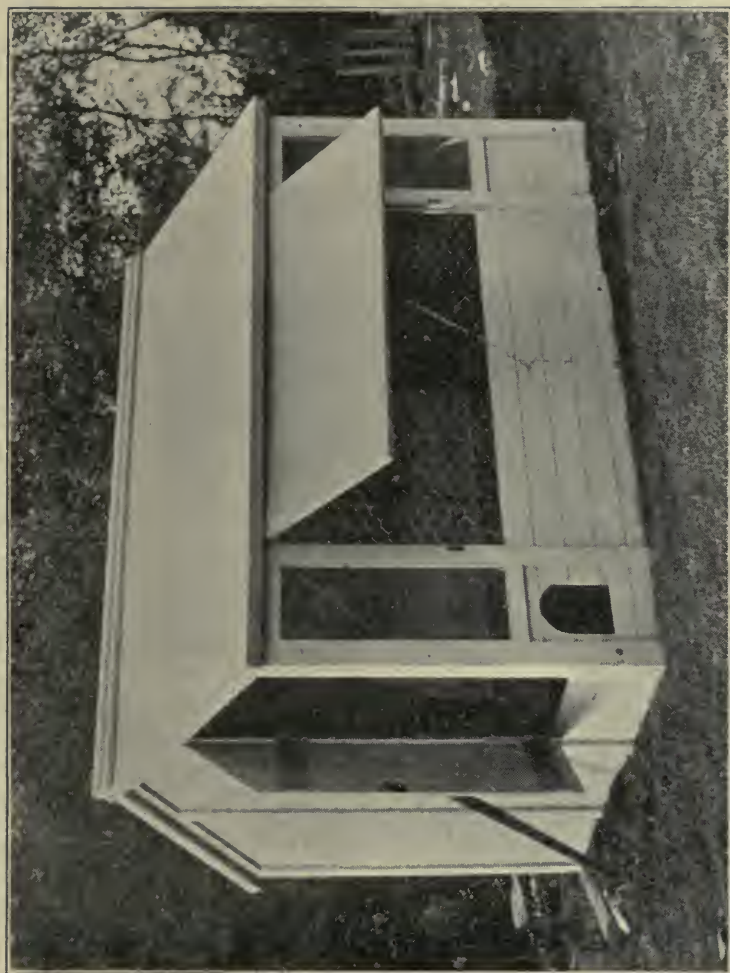


Fig. 4.—Portable Scratching Shed (Anglo-American Company)

the surface, neither grass nor gravel being used. The splendid fruit trees, many of which were enclosed in the runs, afforded shelter and enjoyment to the birds. The finest specimens of almost every variety were to be seen, the familiar Langshan, Wyandotte, Leghorn, Dorking, Rocks, Houdan, besides La Flèche, La Bresse, Campine, Mantes, 'la poule de ferme par excellence,' and the very handsome fancy breed, the Padoue, gold, silver, white, and other varieties. Some two or three hundred birds were housed in these beautiful surroundings, and formed the most delightful and artistic poultry farm it would be possible to imagine.

"In the afternoon M. de Perpigna drove us out to see his dogs, and then on to the farm, which was very extensive. The herd of Breton cows was just being milked, some fine goats browsed in another field, and hundreds of rabbits filled cages round the farm yard. Geese, ducks and chickens (chiefly the Mantes) roamed about in large

numbers. The country round was very undulating and highly cultivated, and the whole appearance of the place bathed in the afternoon sunlight was charming and restful in the extreme.

“The satisfactory thing about the whole from a practical standpoint was that it seemed to be in every way a financial success, and M. Perpigna gave it decidedly as his opinion that poultry could be made to pay.

“The ‘Etablissement’ proper was situated on the high road from Mantes, and consisted of a charming old house covered with a lovely creeper, the Incubator, Room, Offices, and Workshop where the appliances were made.

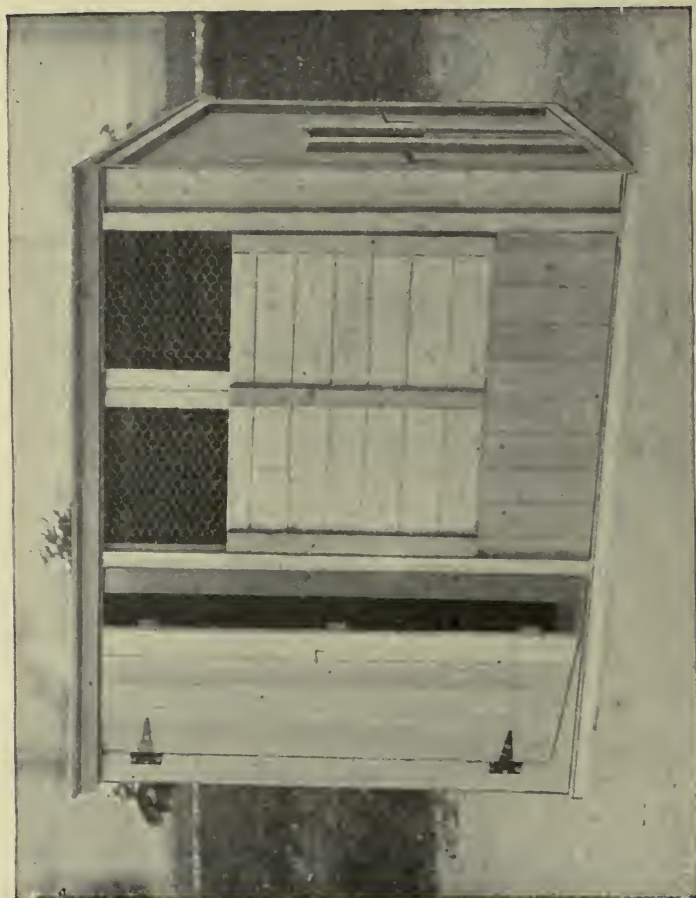
“Some twenty-two large Incubators, heated by hot water, and holding 150 to 500 eggs each, occupied the centre of the room. The shining brass taps and railings and general appearance of care and order was a notable feature, as were also the ‘secheuses,’ or drying boxes for newly hatched chickens, and the foster mothers which extended all

along one side of the room. The chickens in all stages of growth looked most healthy, and are hatched all the year round.

“In the same building we were shown a ‘Gaveuse’ or fattening machine with an automatic action and gauge indicator for rations; by this arrangement the exact quantity of food can be regulated, and no undue pressure exerted to fill the bird’s crop. This Gaveuse has the recommendation of appearing more humane than the ordinary cramming machines.”

But to return to the Housing Question. ^{Houses and appliances} If the embryo poultry keeper wishes to spend some of her capital on appliances and start with an “up to date” appearance, then I would advise her to do, what my friend did, write to a few of the best known appliance makers for illustrated price lists, remembering to ask for discount for ready money, or for any other financial arrangement that the firms may make. (Some of course are so well established that they can enforce their

list prices, but others are more open to arrangement.)



Meech's Improved Lean-to, from 35s.

The next point is to make a selection of the necessary houses, shelters, runs, brooders,

troughs, etc., and order them, being prepared for the inevitable delay in obtaining the same,



Meech's Improved Covered Run, from 25s.

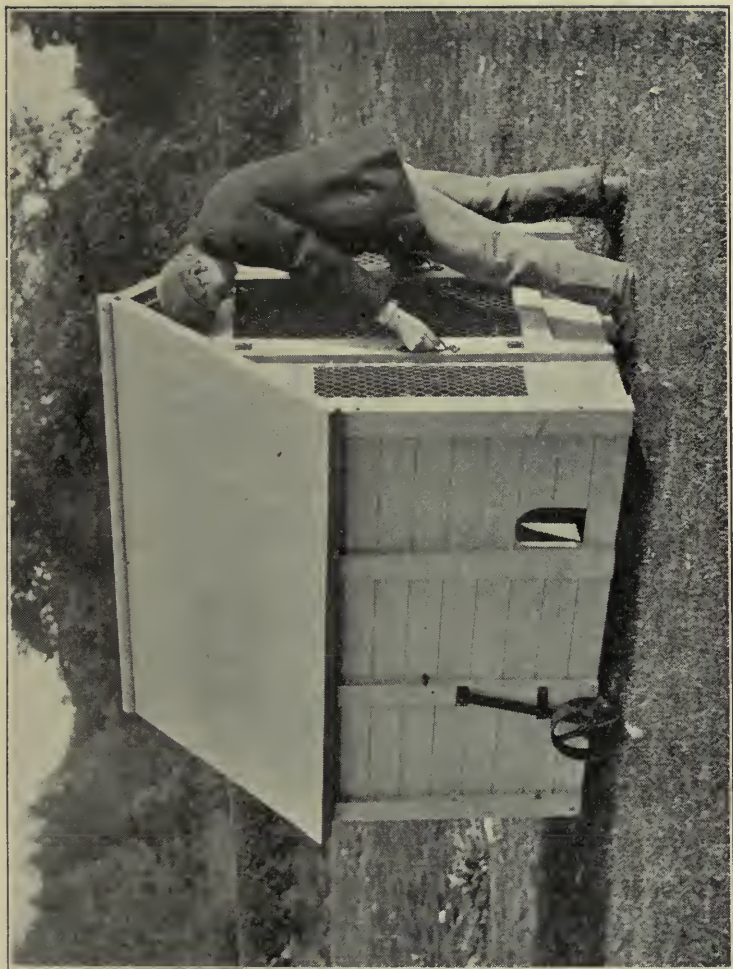
as few firms keep a large stock ready made. If, ^{Home-made} on the other hand, money is a consideration, ^{houses}

and one is willing to do with make-shifts, there are many ways in which packing cases and other things can be utilised, and satisfactory results obtained. Here, let me add

Knowledge of parenthetically, a knowledge of carpentering, carpentering useful even a small one, can be turned to very good account. In fact a course of lessons in carpentering is a valuable asset to put in

Points to remember with one's stock-in-trade. The chief things to remember in constructing a fowl house, whether from packing cases, bacon boxes, or anything of that description, are that the roof should be rainproof, the sides draughtproof, with plenty of ventilation at the top; the perches should be placed on one level, about 18 inches apart and about 2 feet from the ground—this is to keep the fowls away from the bad air which always rises to the top whether of a sitting room or a chicken house, for it has been abundantly proved that the purest air is to be found about half way between floor and roof or ceiling.—Be careful not to put too many birds

Number of birds in house



Brooder House on Wheels (Anglo-American Company)

into one house or run, as they do not do well if they are crowded. The floor can be



Recording Nest

covered with peat, moss, litter, or sand or ashes; the former is the most expensive, but

it is a great deodoriser, and therefore helps to keep the birds healthy.

Roofs For the roof, corrugated iron with a lining of straw is very satisfactory, whilst if felt is used it must be thoroughly tarred. Mr Webster suggests in his book, that if Portland cement be sprinkled over the tar whilst it is wet, the surface becomes quite hard and impervious to weather.

Feeding The feeding of the birds is the next point to consider, and this is where great extravagance may come in. There is such a variety of food, with so much that is really inferior mixed with the better samples, so many patent foods advertised to do everything, that only hard bought experience teaches the poultry keeper where to buy to the best advantage for her own pocket, and to produce the best results on the birds. The cost per bird per year ought not to exceed 5s., therefore if it works out at 13s. and more the poultry will never pay. The household scraps are a most valuable addition, especially

when mixed with sharps or barley meal and given hot in the early morning.

This can be done by letting the potato peelings, etc., stew on the kitchen fire all night, or where this is impossible let them cook in a jacketed cooker placed in some outhouse. Parish's patent Steam Jacketed Cookers



Parish's Steam Jacketed Cooker

Steam
jacketed
cooker

are especially to be recommended, because a supply of hot water can be obtained at all times, on pouring cold water into the geyser. The food is placed in an inner vessel, around which hot water circulates in a jacket, and cooks the food well and thoroughly without drying it up. Heat can be supplied

either by gas or by fuel, and the cooker is simple and easy to work; one to hold 4 gallons costs £4, 10s.

Foods The six staple foods are: oats, sharps, wheat, barley, maize and peas; of these wheat and oats are the best for everyday feeding, with an addition of barley in wet, and peas in very dry weather.

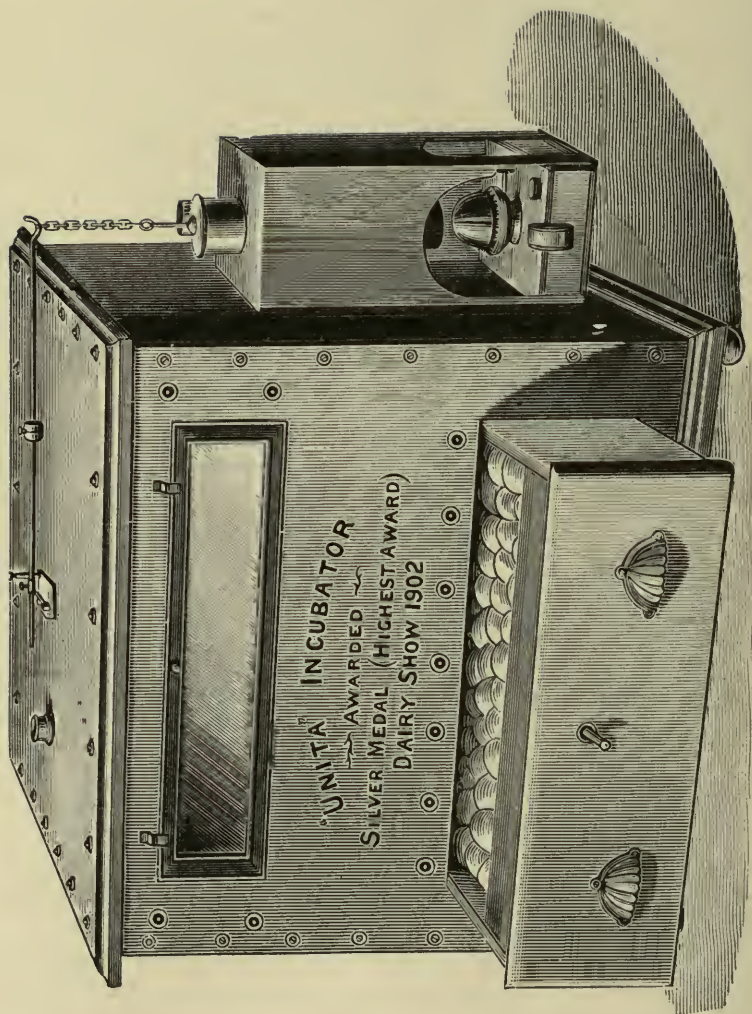
Egg production A beginner will do well to confine his poultry keeping at first to Egg Production, as this is looked upon as one of the most profitable branches. It is estimated, as before stated, that a hen should cost to keep 5s. per annum and a good layer should average from 160 to 170 eggs in the year, which will bring in 13s. 4d. to 14s. 2d. per bird, reckoning the eggs at 1d. each, which is a low average, as between November and March it is easy to get 1½d. each. Therefore each laying hen should give a profit of from 8s. to 9s. a year. Some of the eggs can be used for setting as the hens get broody, and a new stock brought up to take

the place of the two year old hens, which should be sold off or killed.

Poultry fattening is another paying branch of Utility Poultry Keeping, but it is thought wiser not to rear chickens for this purpose, but to buy them at four weeks old. To fatten successfully a special darkened shed is necessary, cages have to be made, and a cramming machine bought. The work also makes great demands on a person's time, besides being distinctly distasteful to some.

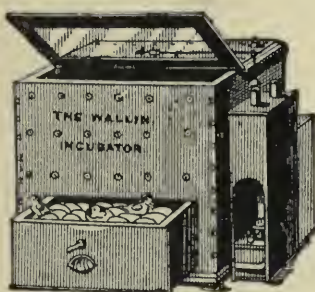
An incubator is almost a necessity ; it is a considerable outlay to commence with, but in these days of necessity for rapid production it is difficult to do without artificial aid.

In these again the English makers have been beaten by Americans. Hearson's, which has long held the first place in England for quality, reliableness, and generally giving the best results, has also retained its original price of £10, 10s. for 100 egg capacity. Tamlin's is generally put second : that is also expensive. Whilst among cheaper makers

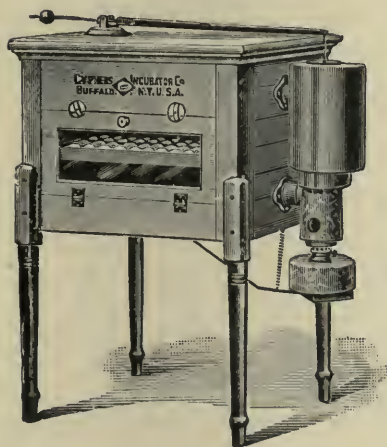


"Unita" Incubator

can be placed the "Unita," which took two silver medals at the last Dairy Show, 1902, price £4 for 50 eggs and £5, 5s. for 110 eggs; and the "Wallin," £3, 10s. for 60 eggs, and £4, 10s. for 100 eggs.



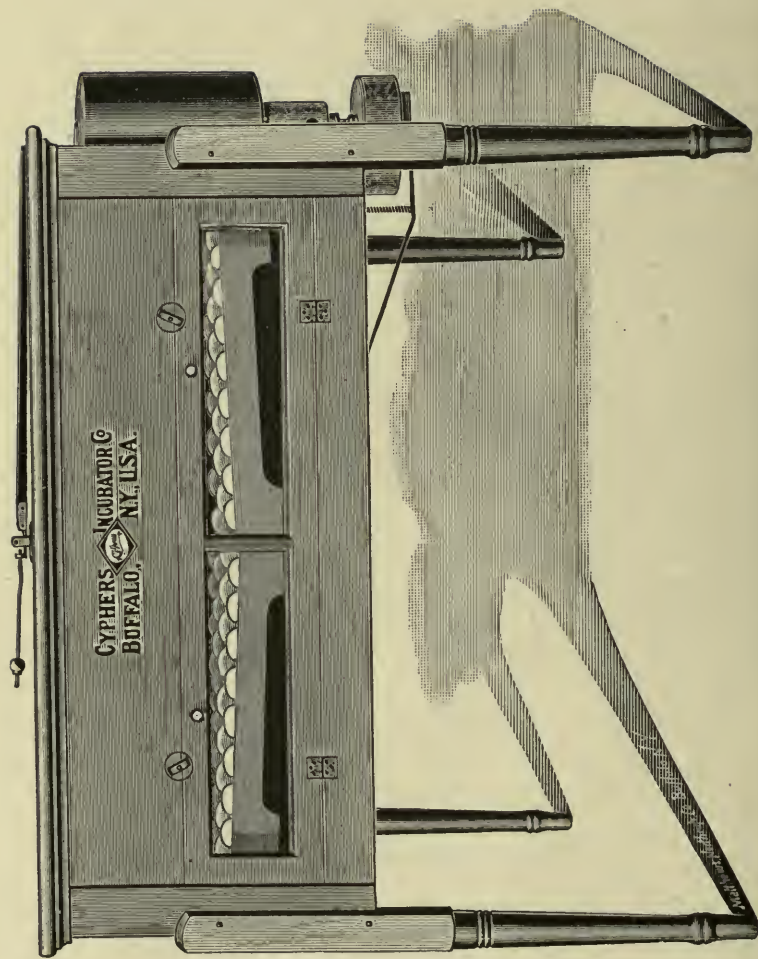
Wallin Incubator

Cyphers Incubator,
50 egg capacity

with two machines, have brought out no less than five, varying in price and capacity from £3, 15s. for 60 eggs, and £5, 10s. for 120, to £8, 15s. for 360, and even a double decker to hold 440 eggs.

This firm claims a larger hatching

average for its machine than has been



Cyphers Incubator, 220 egg capacity

attained by any other incubator; that the chicks are stronger; that it is fireproof, requires no moisture, and that they give



Chickens just hatched in a Cyphers Brooder

with each machine a warranty that it will last ten years without repairs.

Of course, like everything else, experience is required to manage an incubator successfully. The lamp must be kept cleaned and regularly trimmed so that the temperature is kept uniform, and the eggs must be turned

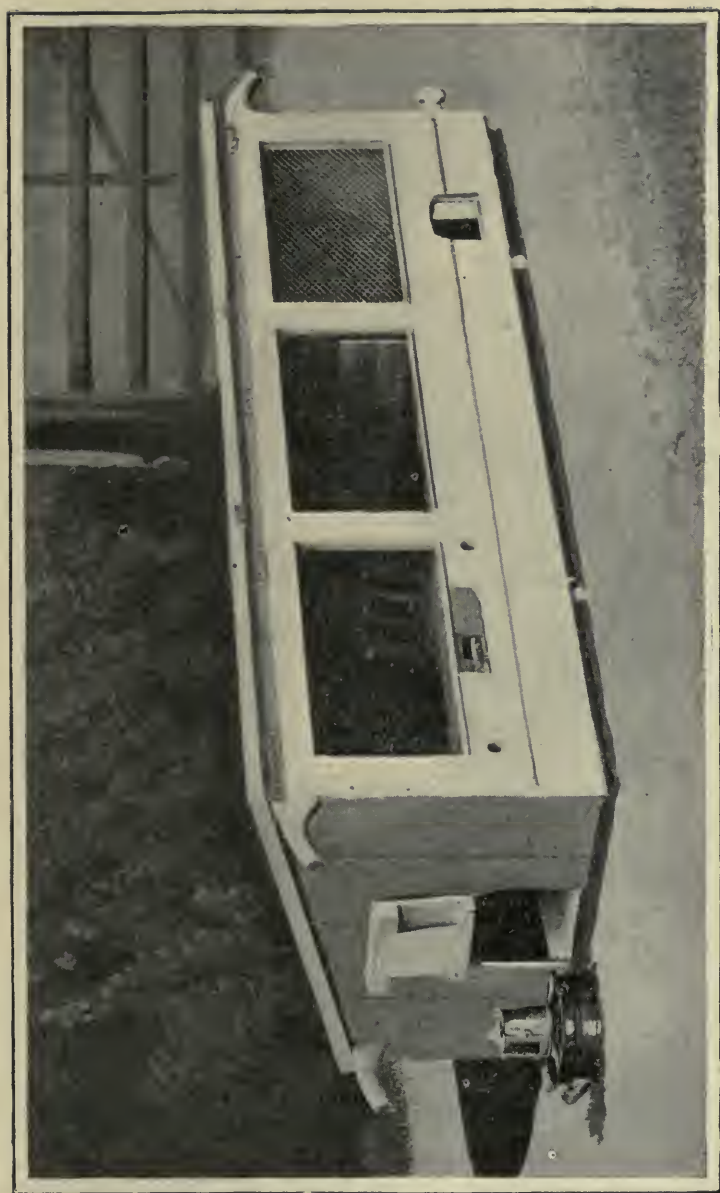
Care of chickens daily. A certain percentage of eggs are expected to prove unfertile, but not necessarily 50% as I have known to be the case,



Cyphers Three-Apartment Unequalled Outdoor Brooder,
Style A (Front View)

from careless handling. Then the first three weeks of a chicken's life is a most delicate time when artificially hatched, as so many die in these early weeks from cold or damp, or improper feeding.

The Anglo-American Poultry Company have brought out some excellent brooders, which



Outdoor Brooder (Anglo-American Company)



Indoor Brooder (Anglo-American Company)

are invaluable for early rearing; illustrations given on pp. 229, 231, show the outdoor brooder both open and closed. This one with the *improved* lamp answers splendidly, as the chicks have the warm chamber at night; a second one which should be carpeted with fresh cut turf (from which the chicks can pick up much entrancing diet), and a third which is cold but yet protected from the weather, although they can get out to the runs through the little door, when such a course is desirable.

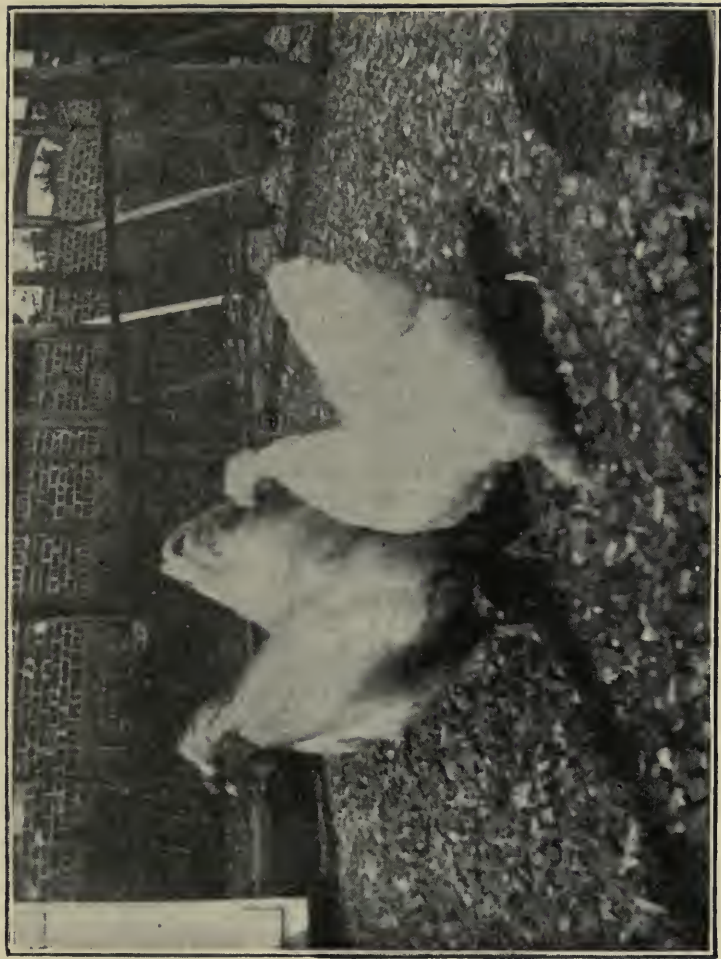
Considering poultry keeping as a whole, it should be a profitable branch when taken with other work on a small holding, but to make it pay really satisfactorily, it requires an immense amount of *caré*, hard work and perseverance, because no matter what the weather may be, out the poultry keeper *must* go to tend her birds so many times every day, from the hot meal in the early morning to the shutting up the last thing at night. On the other hand, it is an extremely interesting

Poultry
keeping can
be made
profitable

occupation, and when combined with experiment and research it gives ample scope for intelligence and skill of the highest order, and it is here especially where the well-trained mind should come in and make a great success, because "there is plenty of room at the top," only the lower parts being crowded.



Lady Warwick Hostel—"Preparing for Ascot"



Lady Warwick Hostel—A Pair of "Silkies"

BEE-KEEPING

CHAPTER IV

BEE-KEEPING

INTRODUCTION

OF all the lighter branches of agriculture, bee-keeping is quite one of the most fascinating. Although of late years it has come into much prominence, it is no new thing, as, in all ages, intelligent people have found interest, recreation, profit and delight in the care of these wonderful little creatures.

In this short space, only the most important points in bee-keeping, from an economic point of view, will be touched upon.

Practically, it is only since the establishment of the British Bee-keepers' Association in 1870, that bee-keeping has taken a definite place as a profitable rural industry.

As this book is intended, primarily, for women, the writer would like to lay special stress on the suitability of apiculture as a part of any rural occupation they may pursue. It has everything to recommend it and nothing to detract from it, except the one fact that bees are provided with stings, and that from time to time they see fit to use them.

It has been said that success in bee-keeping depends upon "dexterity of hand and celerity of foot," certainly the first is necessary, and, in the writer's experience, more usually possessed by women than by men, while the second quality perhaps belongs most generally to men.

No one anxious to take up bee-keeping need be deterred by the thought of the stings. A veil may be worn, which will thoroughly protect the face, and the beginner may start by wearing gloves, when manipulating.

In time, however, when confidence and

deftness have been attained, these will be discarded. After a short period the bee-keeper becomes sting-proof, and except for a momentary inconvenience, the stings have no effect. Stings are, moreover, said to be an excellent cure for rheumatism, if taken in sufficient quantity!

In some cases apiculture is adopted as a profession, and there is no doubt that by anyone who thoroughly understands the subject in all its different branches, as good a livelihood can be made in this way as in any other.

It will be necessary to have from 100 to 150 hives, never less than 100, and to work for both comb and extracted honey.

In addition to this must be included the sale of bees and queens, and the manufacture of appliances, and from these combined, good returns should be secured.

The greater number of bees are kept for one of three purposes.

Either as a means of money-making in conjunction with fruit farming or poultry keeping, by the scientist, or simply for the pleasure the keeping of them affords. They are a never failing source of healthy interest and recreation. All successful bee-keepers are enthusiasts, and there is a *bon camaraderie* amongst brethren of the craft, which is unequalled in any other pursuit. An experienced bee-keeper is always anxious that others should take up the work, and is willing to give time and trouble for their assistance, and gladly, for the benefit of the beginner, to impart all the knowledge he has acquired.

To be able to take an intelligent interest in the work of the hive, it will be necessary to understand something of the natural history of the bee.

A book to study The history, anatomy and physiology is fully dealt with in Cowan's "Honey Bee," which should be studied previous to commencing bee-keeping.

ECONOMY OF THE HIVE

At the beginning of the honey-gathering season, the population of the hive consists of (1) the queen mother, or as she is usually called the "queen"; (2) a few hundred drones; (3) from 40,000 to 50,000 workers.



Queen



Drone



Worker

The queen is the only perfectly developed female in the hive, and it is she who lays all the eggs from which the other bees are produced. A good queen, in her prime (from one to two years old) lays between 2000 and 3000 eggs per day, during the breeding season.

If allowed, the queen will live from four to five years, being considerably longer lived than her subjects.

Only one queen is allowed in the hive at a time, but, if from any cause, the queen is lost or killed, or if she becomes old and infertile, or when the bees are preparing to swarm, a certain number of royal princesses will be reared, one of which is destined to take her place. From four to five days after the young princess is hatched, she leaves the hive on her "nuptial flight" for fertilisation by the drone. Except when heading a swarm, this is the only time on which a queen leaves the hive.

Fertilisation can only take place on the wing, but once accomplished it suffices for life.

Two days after returning from her flight, the queen commences to lay eggs, which are of two kinds, those producing drones and those producing worker-bees.

Queens are produced from the same eggs as worker-bees, but under different conditions of feeding and treatment, and the queen can decide whether she will lay drone or worker eggs.

If, by any chance, the queen fails to become fertilised during her flight, she will only be able to lay drone eggs, and will be of no use as the mother of a colony.

The queen may readily be distinguished from the other bees by her size, shape and colour. Her body is much longer and tapering towards the extremity, she is darker and glossier, and her wings are proportionately shorter than those of the drone or worker.

Her sting, which is never used except in combat with a rival sovereign, is curved instead of straight. As her function in life is merely to produce eggs, she is not provided with any means for extracting honey from flowers.

The drones are the males, and exist only The drones for the purpose of fertilising the queen. They are much larger and bulkier than the workers, but not so long as the queen. They do no work for the support of the hive, but depend upon the workers' labour.

They have no sting. At the end of the breeding season, when the honey harvest is drawing to a close, and when they are no longer required, the workers set upon them and eject them from the hive, either stinging them to death or leaving them to starve.

Should the drones be retained in a hive in the autumn, it is a sign that the hive is without a queen.

The workers The workers complete the population of a hive. They are much smaller than either queen or drones, and on them the whole life of the colony depends. Indoors, they act as nurses or protectors of the brood ; they provide food for the queen and drones ; build the combs ; clean the cells, and ventilate the hive.

Outdoor work consists in gathering honey, pollen and propolis. In short, every duty connected with the marvellous organisation of the hive depends upon them.

On account of the hard, incessant work which they perform, the life of the workers only extends over a period from six to eight

weeks in the honey season. The bees hatched in autumn usually live through the winter, and commence the work of the colony in the ensuing spring.

The queen takes fifteen days to hatch from the time the egg is laid to the time when she emerges from the cell as a perfect insect, the workers twenty-one days, and the drones twenty-four.

Wax is not gathered by the bees, but is ^{Wax} secreted by certain glands situated on the under side of the abdomen, and from this wax all the honeycomb necessary in the hive is made. These combs consist of numerous six-sided cells, the size of which varies according to the kind of bee which is to be hatched in them.

The cells in which worker bees are ^{The cells} hatched are the smaller, five worker cells or four drone cells occupying an inch in width. The cells are placed back to back, with their openings sideways and slightly tipped upwards.

The cells in which queens are hatched are of a different shape. They are rather pear-shaped, and hang with their mouths downwards. They are about an inch long and one-third inch in diameter.

The cells used for storing honey are the same as the drone and worker cells. The bees themselves usually prefer the drone cells for this purpose.

Pollen or
bee bread

Pollen or bee bread is the fertilising dust of flowers, gathered by the bee on the hairy under surface of her body. She then collects it and kneads into a kind of sticky dough with honey, after which it is placed in the pollen baskets found on her third legs, and in that manner it is carried home. Pollen forms the nitrogenous part of the food of the bees, and is absolutely essential in preparing food for the larvæ. The adult bees also use a certain amount for their own nourishment.

When not required for immediate use it is stored in the cells.

Propolis

Propolis is a sticky substance which exudes

from trees, such as pines and horse chestnuts, especially from the buds. It is also carried home like pollen on the third legs of the bee, and it is used for stopping up every crack and opening in the hive.

ARRANGEMENT OF THE APIARY

The apiary should be arranged so as to face south or south-east.

It is very essential that the early morning sun should fall upon the hives, and so cause the bees to get out to work early. In winter, every ray of sun is precious, and helps very much in keeping up the temperature of the hive.

The hives should be, as much as possible, protected from the north and west winds, either by a good hedge or trees. Bee-hives may advantageously be placed in an orchard. The fruit trees afford shade to the hives in the summer, and what is very important, an early supply of nectar, close at hand, in the spring.

Relation to
fruit farming

Apple, pear, cherry and plum blossoms are much liked by the bees.

On the other hand, the trees profit enormously by the visitations of the bees, and orchards in which sufficient bees are kept very often yield quarter or even half as much fruit again, as where the trees have to depend on the chance fertilisation of wind and insects.

Anyone going in for fruit farming should make a point of having twenty to twenty-five hives for every one or two acres planted, and if he or she does not care to go to the trouble or expense of working them so as to secure a good honey yield, the larger return of *perfect* fruit will repay him or her for the outlay on the hives.

Arrangement
of hives

The hives should be placed from three to six feet apart or farther, where there is the necessary accommodation, with a good path, not less than three feet wide, running at the back. All manipulation of the hive must be done from the back. From the entrance or

alighting board of the hive, a board the same width as the entrance should slope gently to the ground, otherwise bees returning home heavily laden with honey or pollen, very often drop just short of the alighting board from fatigue, and since, owing to their burdens, they are unable to rise, frequently perish.

Bees depend largely upon white clover for their supply of honey, so that it is necessary to ascertain before establishing an apiary that white clover grows freely in the neighbourhood. The situation of the hive

Fruit trees of every kind, white and red clover, Sainfoin and lime trees are all excellent in proximity to an apiary.

There should be a shed or building fairly near to the apiary, where hives, appliances, etc., may be kept, and all necessary work done. If it is to be used for extracting honey it should be made "bee-proof," that is, there must be no crevice large enough either in walls, windows or under doors through which a bee can enter.

Necessary
appliances

It is a mistake to start by buying all the appliances which one thinks one may want for all future occasions. At first provide only what is absolutely necessary, and wait to enlarge the apparatus with one's experience.

The things which are absolutely necessary are :—

- | | |
|--------------------|---------------------|
| 1. A hive. | 7. Comb foundation. |
| 2. A skep. | 8. Section boxes or |
| 3. Smoker. | shallow frames. |
| 4. Feeding-bottle. | 9. A veil. |
| 5. Extra quilts. | 10. Naphthalene. |
| 6. Two supers. | 11. Bees. |

All the first mentioned should be in readiness before the bees are purchased.

Handling
the bees

Before advising as to the best method of obtaining the bees it would be as well to say a few words on the subject of handling them.

The bee has been provided with a sting as a weapon of defence, and does not, as a rule, use it unless provoked to anger by unskilful, rough or careless handling.

Bees, like men, are rendered gentle by a good dinner, and if they can be made to gorge themselves with honey, they are very easily handled. For this reason, a swarm of bees may be manipulated with impunity, without veil or gloves, as before leaving the hive to seek a new abode, the bees fill their honey sacs as full as possible, knowing that it may be some time before they can get another meal.

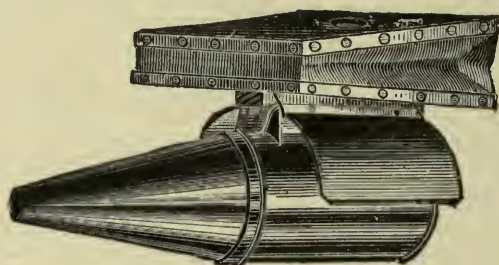
Bees will also fill themselves with honey if they are frightened, and that is why we use what we call a "smoker," in which we burn brown paper, coarse dry sacking, or old fustian.

Before opening and manipulating the hive, blow a few puffs of smoke in at the entrance. This serves to intimidate the bees, and they immediately run to the honey cells and fill themselves with food, after which they are comparatively harmless.

The smoker should be kept at hand, and a few puffs of smoke given now and again, if

the bees become restless. Do not use too much smoke, or the bees may lose their placidity and grow irritable.

A cloth moistened with a carbolic solution of one part Calvert's carbolic to two parts of water is also used for quietening the bees.



Smoker

This is laid over the frames for a minute or so in the place of the calico quilt, and the bees, disliking the smell of carbolic, go down to the lower part of the hive.

Extreme gentleness and care are necessary in handling bees, and the work should be done with steadiness and determination, so as to give the bees the impression that the operator is a Nemesis against which resistance is useless.

On the other hand, nervous jerky movements, jarring of frames, knocking against the hive, etc., irritate the bees to such an extent that they rush out to inflict punishment on the unlucky offender.

It should be borne in mind that bees are more amenable at certain seasons and under certain conditions than at others. For instance, in spring, when they have few, if any, stores to guard, and when honey is coming in freely, they may be approached without veil or smoker, whereas, in autumn, after they have been robbed of the fruits of their labour, they are very fierce.

In hot weather they are also often very irritable, and any necessary manipulating should be done either very early in the morning or in the cool of the evening. If bees are found to be fierce and excited, it is not advisable to persist in one's operations, rather leave them for a day or so, till they have calmed down. To be able to judge

when to humour the bees in the right way is only learned by experience.

The removal of surplus honey is an operation which always annoys the bees, more or less, and therefore it should be carried out with special quickness and deftness, having everything required in readiness before beginning.

A veil should always be worn, it is no inconvenience, and makes the wearer more or less independent.

It is especially needed by women, because the bees always become entangled in the hair, and are nearly certain to sting before they can be removed.

Gloves are not advisable, and it is much better, from the first, to accustom one's self to work without them. For those, however, who are too nervous to dispense with them it is best to wear a pair of woollen gloves, with cotton ones drawn over them, and if these are damped, the stings will not make any impression.

There are several varieties of bees, some of which are much more gentle than others.

The English Black Bee.—The bee usually kept in England is the ordinary English Black Bee, and this has been found after many experiments to be the best all round bee for our climate, notwithstanding the fact that it is not so good tempered as one or two of the foreign varieties.

Their comb honey sells well, as it is beautifully white.

The young bees begin to work outside much earlier than the young ones of other kinds, and they are more ready to begin work in supers in the spring, owing to the fact that they produce and maintain a greater amount of heat than the same number of any other sort.

The Italian or Ligurian Bee.—Italian or Ligurian bees were the first foreign variety introduced into England in 1859. They are rather like our black bee in size and appear-

ance, except that they are light in colour, and have three yellow rings on the abdomen.

A cross between Italians and black bees results in a very good working strain.

The introduction of these bees has done a great deal of good by bringing new blood and fresh energy into our native race.

Italians do not produce such good comb honey as the blacks, nor are they such good comb-builders. They go up into the supers less readily and are not so suitable for queen rearing. On the other hand, they are more active, working earlier and later. They can gather nectar from flowers not visited by the black bee, and are also more amiable in disposition.

The Carniolan
Bee

The Carniolan Bee.—Carniolans are natives of Carniola in Austria, and are supposed to be pre-eminently the “beginner’s bee,” owing to their good temper when being manipulated.

They are an excellent variety for all purposes, their one failing being an excessive

propensity for swarming. If this can be overcome by plenty of ventilation and room, in advance of their requirements, they are much to be recommended.

Other Varieties.—Other yellow varieties which have been introduced from time to time are the Cyprians, Syrians, and Palestines, but experience has shown that though they have many good qualities, these do not make up for their undesirable ones, amongst the worst of which is a very variable temperament, some of them being so vicious that it is almost impossible to approach them. They are now very little imported.

There are many kinds of hives on the Hives market, and it would be impossible in this short space to attempt to discuss them.

Bees will work almost anywhere, and an experienced bee-keeper could comfortably manage a stock of bees in a badly made or badly constructed hive, whereas to a beginner they would be a constant source of worry and stings. It is therefore essential that we

have a hive of best workmanship and constructed to suit the requirements of the bee. By going to the Apicultural Department of any of our Agricultural Shows, specimens of the different makes of hives may be seen and examined.

Until about twenty years ago, bees were rarely kept in anything but the old-fashioned straw skep, and it is only since the more general use of the movable frame-hive that bee-keeping has made such strides in this country.

With the skeps, the bees built the combs just as they liked, fastening them to the inside, and so, of course, they could not be removed. They remained sometimes for years, after they had become diseased, dirty and black; moreover, owing to the cells becoming thickened and small, the bees hatching from them were undersized and less vigorous than they should have been.

In skep bee-keeping, practically everything was controlled by the bee. With the movable



Examining Frames in Hive

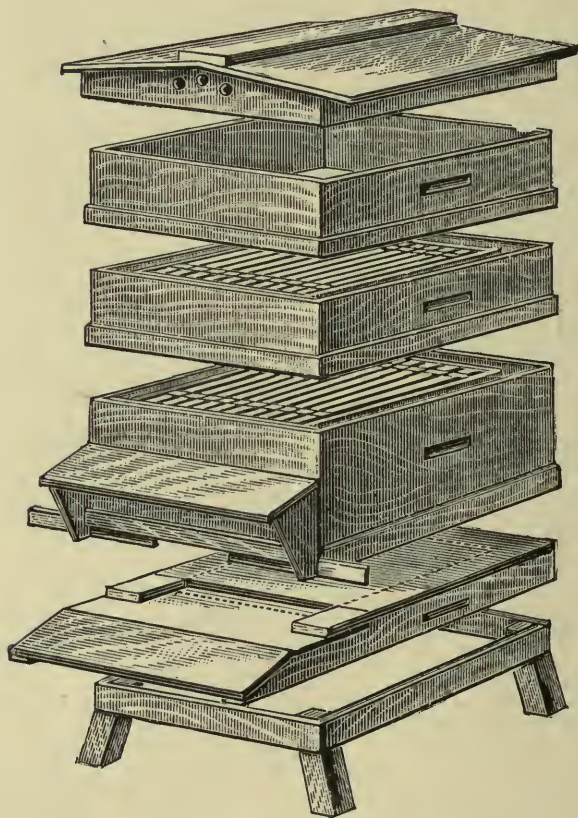
frame hive, the position is reversed, and the bee master finds himself with the upper hand and able to regulate the number of drones and workers hatched, to raise queens, regulate swarming, or examine quickly and easily the interior of the hive for disease, queenlessness, or scarcity of food.

The hive which combines the greatest number of good points, some of which are possessed by each, is undoubtedly what is known as the W.B.C. (William Broughton Carr) hive, named after the inventor, and anyone starting bee-keeping would do well to have all hives on this pattern.

It is more expensive than some others on the market, but the extra convenience in working saves the money several times over, in time and temper.

It costs unpainted about £1. In cases where this price is too high, a very good "Cottager" hive may be obtained for 12s. 6d. from James Lee & Sons, 10 Silver Street, Bloomsbury, W.C.

But whatever hive is chosen, it cannot be too strongly urged that only one pattern



W.B.C. Hive, showing different parts

should be used in an apiary, unless for experimental purposes.

The W.B.C. hive consists of :—

1. Stand with splayed legs.
2. Loose floor board.
3. Outer case, enclosing the brood chamber or body box, to take ten standard frames, with a division board or “dummy” for use when all the frames are not required.
4. Over the body box is worked a super for shallow frames or sections, if desired.
5. A lift (for use when more supers are put on, to heighten the hive).
6. The roof.

For successful and profitable bee-keeping, ^{Frames} the frames must be movable.

A standard size of frame has been adopted by the British Bee-keepers' Association, and all hives are made to take these frames.

The outside measurements are :—

Top bar, 17 inches long.

Bottom bar, 14 inches long.

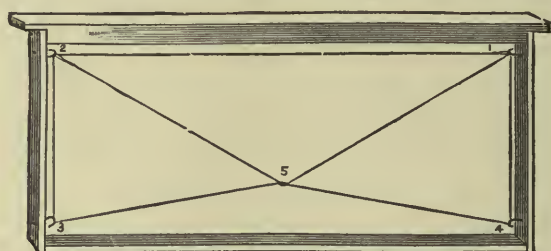
Side bars, $8\frac{1}{2}$ inches deep.

Worker comb in a hive is found to be

$\frac{7}{8}$ -inch thick, so the width of the frames is made just about $\frac{7}{8}$ -inch.

They are placed from $\frac{3}{8}$ to $\frac{5}{8}$ of an inch apart, which makes a distance of $1\frac{1}{4}$ to $1\frac{1}{2}$ inches from centre to centre.

For the production of worker brood $1\frac{1}{4}$

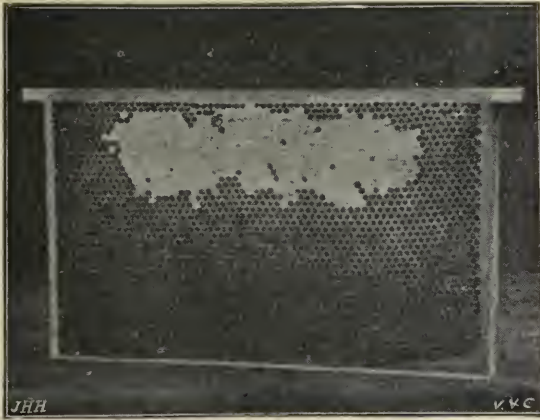


Wired Frame

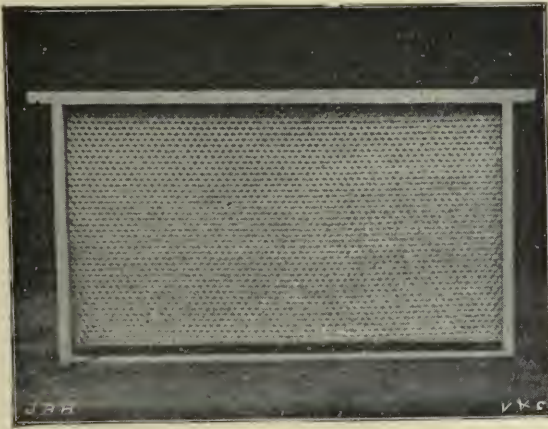
inches is sufficient, but the distance from centre to centre is not a hard and fast rule.

There should be a space of $\frac{1}{4}$ -inch round the sides of the frame, and $\frac{1}{2}$ -inch at the bottom. If less room than this is left, the bees will stick it up with propolis, and if more, they will build comb between the frames and the wall of the hive, so defeating the apiarist's purpose, by making the frames no longer movable.

Standard frames are of two kinds, the



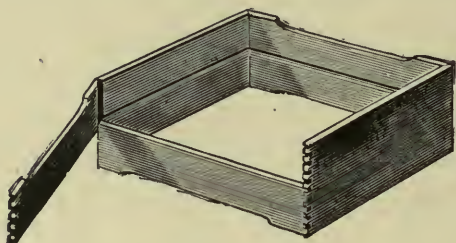
Frame of Comb, showing Brood



Frame fitted with Foundation

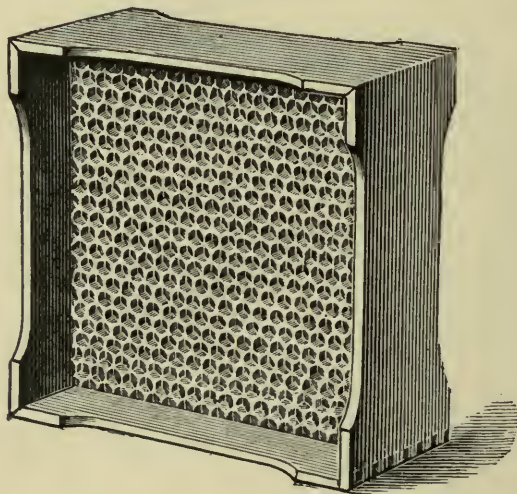
brood frame, which is the size already given,

and the shallow frame, which is the same as the other except that it is $5\frac{1}{2}$ inches deep,



Section

instead of $8\frac{1}{2}$. These are used for storing honey on top of the brood frames.



Section fitted with Foundation

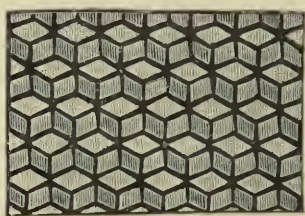
Sections Sections are little boxes made of white

wood, $4\frac{1}{4}$ inches by $4\frac{1}{4}$, $\frac{1}{8}$ -inch thick and 2 inches wide, except at the top and bottom, which are $1\frac{3}{4}$ inches wide. When they are put together and placed over the brood frames, the bees have just room to pass up into them through these $\frac{1}{4}$ -inch spaces. They usually contain about 1 lb. of honey, and as they are small, clean, and easily handled, there is often much less difficulty in disposing of sections than of jars of extracted or run honey, although the sections command a higher price.

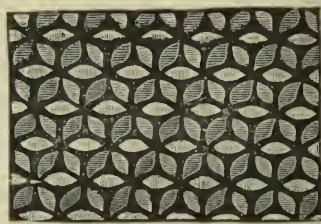
The sections are bought in the flat all ready prepared for folding, and are made up by the beekeeper into box-shape without trouble.

Brood frames, shallow frames and sections Foundation are fitted with comb-foundation, which consists of sheets of pure beeswax passed through rollers, which are engraved in such a way as to give the wax, as it passes over them, the shape and appearance of the comb made by the bees themselves. In addition

to the impress of the base of the cell, there is enough wax in the slightly projecting walls for the bees to draw out the cells to their full depth. This is an enormous saving of time and material, because a bee needs to consume from 10 to 15 lbs. of honey to make 1 lb. of wax.



Worker Cell Foundation



Drone Cell Foundation

The foundation is impressed either with drone or worker cells, and according to our requirements we can furnish it to the bees.

The foundation for brood frames is considerably thicker than what is used for the shallow frames and sections, which is now made so beautifully thin and transparent that when worked out by the bees it is

scarcely distinguishable in the centre of the comb.

It is necessary to use foundation, as when left to themselves the bees build their combs in all directions, but if sheets or strips of this foundation are fixed to the under side of the top bar of the frame, it becomes a guide on which they work.

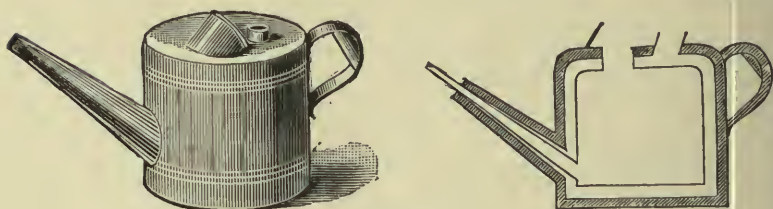
There are, of course, different methods of fixing foundation in frames and sections, and for a beginner it would be a saving of time, and probably material, to obtain proper assistance in fitting up a hive for the first time.

Perhaps the most simple way is one recommended in Cowan's Guide Book. Procure a piece of wood $\frac{3}{8}$ -inch thick, just the size to fit into the frame, and on the under side nail two pieces of wood projecting about an inch at each end. Then lay the sheet of foundation on the board and place the frame on the projecting ends. Push the foundation well against the under

side of the top bar, and hold it in a slanting position at an angle of about forty-five degrees.

Then pour a little very hot beeswax at the highest point, and it will run down to the other end, and in this way the foundation will be firmly stuck to the wood.

Melt the wax in a smelter. In this it can



Wax Smelter

be kept very hot without burning, as the wax is surrounded by an outer case containing hot water.

BEGINNING BEE-KEEPING

The best time of year to begin bee-keeping is in the spring. During the winter buy a guide-book and study it very carefully. "The British Bee-keeper's Guide Book," by Cowan, is about the most useful,

as it gives minute details of every operation necessary in the apiary.

One or two hives are enough to start with. These should be bought early in the year, so that there is plenty of time to get them thoroughly well painted and ready for use at the beginning of May, when an early swarm may be purchased for from 15s. to £1 (according to district).

If possible, obtain a swarm from a hive which swarmed the previous season, so that one gets a young queen in her second year, when she is at her prime. The bees are most likely to be sold in a skep (the old-fashioned straw hive), from which they must be transferred to the frame hive which has been prepared with about six or seven frames, fitted with full sheets of foundation.

Over the tops of the frames lay a quilt of unbleached calico, with a feed hole cut in the centre.

To get the bees into the new hive, raise How to hive
the bee-swarm

the entrance about one inch by placing two pieces of stick under it at either side, and then cover the board (already mentioned, sloping from the alighting-board of the hive to the ground) with a white cloth or sheet.

The bees may then be sharply shaken from the skep on to the sheet, and in a few moments they will run towards the entrance and into the hive.

When they are all safely inside, the hive front may be lowered, but the door must be left open as far as possible.

A bottle of thin syrup must be placed over the feed-hole in quilt on the top of the frames. Put on another quilt or two above the calico one, and leave the hive undisturbed for a day or so.

If the weather is wet and cold feeding must be continued, but it will not be necessary if it is warm and fine, and there is plenty of honey to be had.

When the foundation is nearly all drawn out, and the queen begins to lay, gradually

fill up the hive until it contains as many frames as it will hold, usually ten.

It would be well for a beginner to secure the assistance of an expert bee-keeper in hiving the first swarm. Much trouble is saved afterwards by having everything right to start with, and although books are useful, they can never be so good as a practical demonstration on the subject.

It is the greatest mistake for a beginner to buy stocks of bees in old-fashioned hives, perhaps of two or three different patterns. It does not matter how cheap they are, they are dear at any price. One usually buys far more than one wants in the shape of disease and worry in working them. Second-hand stocks of bees should only be bought by thoroughly experienced bee-keepers.

BRIEF OUTLINE OF WORK IN THE APIARY THROUGH THE YEAR

The hives should not be disturbed in any *January* way during the month. If wintering has

been properly attended to at the right time, the bees will require nothing.

Opening of the hive occasions great loss of heat, which loss, at this time of the year, is very serious. A good queen begins to lay in January, but if the temperature of the hive is suddenly reduced she ceases to do so, and the brood already in existence becomes "chilled" and dies.

If the sun shines brightly while snow is on the ground, the bees will be tempted out to perish. To avoid this, shade the entrances by placing a board against the front of the hive.

One should now begin to make one's plans for the ensuing season, and to proceed with any preparations possible.

February Much the same advice applies for February as for January. If there are any stocks of which one is doubtful, give a cake of candy over the feed-hole in quilt without disturbing the bees, and cover up again warmly. A little extra covering may

be given, so as to preserve every particle of heat, which, now that the brood is increasing, is so necessary. Also see that all quilts are quite dry. If it is desired to move any of the hives to a different position in the apiary, it may be done now before the bees begin to fly, as bees locate the spot and not the hive, and if the positions are changed later on, the flying bees will return to the old place, and so perish.

About the middle of March on a warm, ^{March} sunny day, the hives may be opened for about five minutes, and the brood nest carefully examined. At this time of the year it is as well to crowd the bees on to as few frames as possible for the sake of the extra warmth.

If short of food, give a cake of candy. Any stocks which have no brood, and are found to be queenless, should be united to the one next to them by the following method:—

Gradually bring the two hives close together, moving them about two feet each

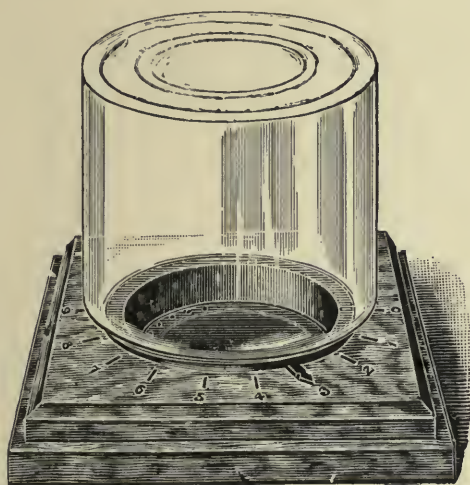
day till side by side. Then give a little smoke, and dredge all the frames of both stocks well with flour. Next, take from the hive which is to receive the bees the same number of frames as we wish to put in from the queenless stock, but be careful not to remove any containing brood or eggs. The frames of both hives should be placed alternately. Success in uniting depends upon the bees having the same scent. By the time the bees have cleaned themselves of the flour they will all have the same scent and the danger of fighting be past.

This operation must be carried out on a warm day, and as quickly as possible, so as to avoid robbing. "Robbing" is the invasion of a weak colony by a strong one, which carries off all the stores of the former, leaving the bees which have not been killed to perish of hunger.

About the beginning of April, in many districts, with favourable weather, the honey season will have begun.

Any stocks which have earlier been found short of food may now have thin syrup given to them instead of candy by means of the feeding-bottle, which is adapted for either

Feeding-
bottles



Feeding-bottle

spring or autumn feeding. It consists of a wooden stage for placing over the frames with a hole in the centre covered with metal, which has a narrow slit half way round it, and a bottle which is provided with a cover having about nine small holes pierced in it. When the bottle is reversed over the

stage, the holes are moved round to come over the slit, which is about one-eighth inch wide. Any number of holes may be turned on. There is an under finger attached to the cover of the bottle, which regulates the supply.

If there is no water supply which the bees can get at, water troughs must be provided, filled with small stones, tea-leaves, or bits of cork.

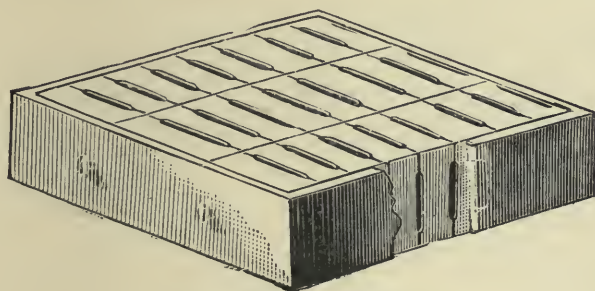
These must be kept full of water, and placed in the most sheltered spot in the apiary. Water is essential to the bees for brood rearing. This trouble is, however, unnecessary where there is a natural supply of water, as the troughs will be disregarded.

April Transfer bees from skeps to bar frame hives about April.

May In May strong stocks are becoming crowded, and care must be taken to see that the bees have plenty of room. This may be done by adding frames, where the

full number (generally ten) has not been given, or by placing on the supers.

A super is a crate or box containing sections or shallow frames placed over the brood frames, and in which the bees will store surplus honey. These can be removed



Super containing Sections

as filled, without disturbing the frames below.

A crate of sections usually contains twenty-one 1 lb. sections, and a box of shallow frames is fitted to take eight or ten frames.

Supering should not be done until the nine ^{Supering} or ten frames comprising the brood nest are crowded with bees, and honey is coming in well.

The time for supering varies according to the district and the state of the weather.

Where there are large fruit plantations near at hand, supers may go on early in May, but when clover and sainfoin are depended upon, it is advisable to wait for a week or two longer.

If the weather should be wet and cold in May, syrup feeding must be continued to any hives known to be short of stores.

It is very important that swarming should be prevented from hives with supers on, for, if this takes place, the bees will forsake the sections, and no surplus honey will be obtained from the hive.

As soon as the bees are working well in the first super, it should be raised, and a second one placed underneath.

Give plenty of ventilation; if very hot, prop up the front of the hive.

Swarming Swarming usually takes place from the beginning of May until the middle or end of July.

The old adage says :—

“ A swarm in May is worth a load of hay,
A swarm in June is worth a silver spoon,
A swarm in July may be allowed to fly.”

Swarming occurs in the height of the breeding season, when the hive is becoming daily more crowded, and unless plenty of room is given the bees' instinct leads them to know that some of them must seek a new home. The first preparation for swarming is the building of a number of queen cells. When these are nearly ready to hatch out, the old sovereign abandons the hive, accompanied by nearly the whole of the adult population, leaving the young princesses, one of which becomes the queen, with all the young bees and any flying bees, which return to the old hive, to form the colony.

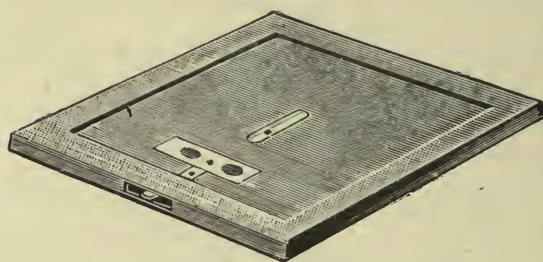
If swarms are hived in bad weather, they must be fed until they can get out to gather honey.

In many places July is the busiest month July for honey gathering, and section crates and

shallow frames should be removed as soon as the honey is fully capped over.

Supers should be removed early in the morning or in the evening, by means of the Porter bee escape.

This consists of a board exactly the same



Super Clearer or Porter Bee Escape

size as the super, having in the centre a bee escape, which is a spring, by which the bees can go down into the hive, but are unable to return.

The super which it is desired to rid of bees is raised, and the board, with the *round* opening of the escape upwards, is placed underneath.

If this is done in the evening, the bees will go down into the hive during the night

and be unable to return. Next morning all that remains to be done is to lift off the super and take it indoors.



Showing working of Spring

In August the honey flow, except in the August heather districts, is ceasing, and the drones begin to be worried out of the hive.

At the end of the season all hives should be examined to see if they have a young prolific queen, and plenty of stores for the winter. The whole success of the next season's work depends to a great extent upon this.

If they are queenless, or if the queen is getting old, a new one must be introduced, and if food is short, feeding with syrup slowly (allow them access to about three holes) must be commenced.

September If, by the end of September, they have not stored sufficient food (about 25 lbs. sealed honey), feed as quickly as possible until they have enough.

November Syrup feeding must not be carried on in November.

If there is then any doubt about their having enough, give a good cake of candy.

Place two or three pieces of naphthalene between the frames of all hives as preventative of foul brood, one of the deadliest enemies in the shape of disease which the bee-keeper has to contend with.

See that the quilts are porous and dry, and that there are enough of them, also that the roofs of the hives are thoroughly water-tight. Open the entrances wide, and then the bees are best left entirely alone until the following February or March.

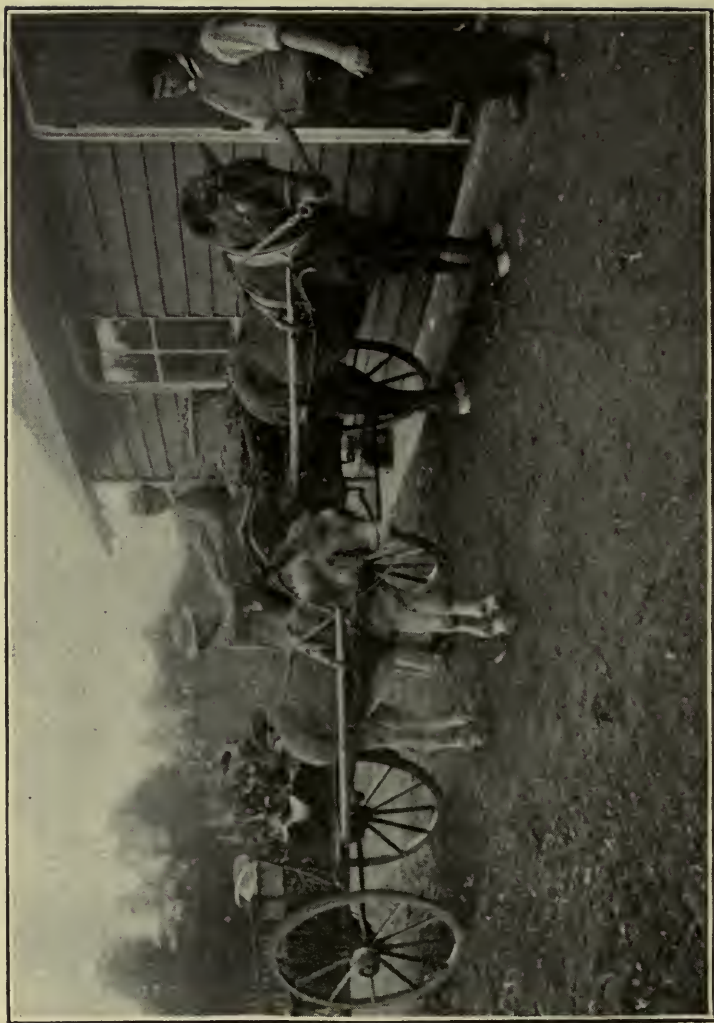
There is in nearly every town a branch of the British Bee-keepers' Association, to which all bee-keepers should make a point of belonging.

A subscription of 5s. per annum entitles them to the "Bee-keepers' Record," a monthly journal devoted to practical bee-keeping, and also to have their apiaries visited once or twice a year by a qualified expert.

By means of associated effort every intelligent man and woman must know that much more may be accomplished in making apiculture a profitable and interesting pursuit, than if the individual relies solely on himself. It is to be hoped that everyone thinking of beginning bee-keeping will make a point of

joining the British Bee-keepers' Association, not only for their own benefit, but to aid the community at large by doing all in their power to enable this association to extend the good work which it has carried on since 1870.

THE MARKETING OF PRODUCE,
A KEY TO THE WHOLE
POSITION



Lady Warwick Hostel—"Ready for Market"

CHAPTER V

THE MARKETING OF PRODUCE, A KEY TO THE WHOLE POSITION

THERE is no doubt that at the bottom of the agricultural problem lies the question of profitable or unprofitable selling. It is not likely that men or women either, can put much heart or interest into work which brings no adequate return, and in many cases even loss, for all the effort expended.

But then comes the reflection, Why should not good produce sell well, when there is always a steady demand for certain articles of food, and an increasing one for fresh fruit and vegetables? The last ten years has seen a remarkable change in this direction, and the amount of imported fruit increases each year.

Bad packing I fear there is one main answer which applies generally, and that is, the produce has been picked and packed so badly, that the prices it commands are of the lowest, and not sufficient to pay for even the small amount of inferior labour expended.

Old methods of work Let us try to picture the methods which have prevailed and still do prevail in country districts which have not been enlightened by, or else refuse to listen to, the County Council Instructor. Perhaps it is the season for soft fruit picking, red or black currants for instance. They are picked into any dirty baskets or boxes which have been lying about all the season, then shaken all together into another odd sieve large enough to take the whole quantity. Perhaps some dirty newspaper lines the sides of the basket, perhaps not. It is almost certain to be put over the top with some leaves, and secured by withes. Then the local carrier calls the next day, or the one after, and takes them into the nearest

town. By the time they reach the green-grocer's shop, they are more or less bruised and spoiled, and only realise second instead of first prices. Take the case of apples, these are picked and thrown unsorted into half sieves, or pots, with a few good ones on the top to deceive the buyer. What is the result? In the market the whole contents of the basket is condemned as "thirds" or worse, and the really good apples fetch no price at all, whereas if they had been sorted and graded and carefully packed the same lot of apples would have obtained good prices in their different grades if they had been true to sample. The Canadian Government have adopted strong measures to stop the iniquitous ^{Canadian Fruit Marks Act} practice of cheating buyers with the contents of the packages. In the Fruit Marks Act of 1901 it provides: "That the face of all fruit packages must fairly represent the fruit throughout," . . . "and to dispose or have in possession for sale fraudulently packed or marked fruit is constituted

an offence within the meaning of the Act.”¹

Irish Board
of Agriculture
and Fruit
Packing

The Irish Board of Agriculture have lately issued a most valuable leaflet on “Fruit Packing,” which should be in the hands of all those really taking this subject seriously. People have only to write to the Secretary of the Department of Agricultural and Technical Instruction, Dublin, to obtain a complete copy; but I think the following extracts are well worthy of a place for their practical simplicity.

SCHEDULE

Section 1.—Gathering

“Apples and pears must be hand-pulled. ‘Windfalls,’ or fruit shaken off trees, must not be mixed with hand-pulled. Discretion must be exercised as to the best time to pull late-keeping apples and pears. (See Depart-

¹ *Woman's Agric. Times*, Feb. 1903, pp. 116, 117.

ment's Special Memo. on Fruit Culture.) Apples and pears of non-keeping sorts should be packed for market as soon as ready for use, so as to be handled only once. All other fruit should be gathered straight into market packages and only handled once. Pickers of soft fruits should sort out the fruit as evenly as possible into different grades as they go along.

Section 2.—Grading

“Apples, whether packed in large or small packages, cannot be too carefully graded. The best apples should be graded by passing them through rings, as follows:—

BEST COOKING APPLES

Above $3\frac{1}{4}$ inches will be classed	A
„ $2\frac{3}{4}$ „ to $3\frac{1}{2}$ inches classed	B
„ $2\frac{1}{4}$ „ „ $2\frac{3}{4}$ „ „	C
Under $2\frac{1}{4}$ „	D

BEST DESSERT APPLES

Above $2\frac{1}{2}$ inches will be classed	A
„ $2\frac{1}{4}$ „ to $2\frac{1}{2}$ inches classed	B
„ 2 „ „ $2\frac{1}{4}$ „ „	C
Under 2 „	D

“The grading of pears must be done so that fruits fill standard packages evenly. The test of correct grading must be the regularity and good fit of the layer in the case, as pears are sold by count, and fruits should be graded so that they will pack in fixed counts of uniform size.

“The grading of soft fruits should be in to large, medium, and small. The grower should see that such fruits are properly sorted out into these three sizes.

Section 3.—Packing

“It is recommended that in the case of very fine fruit—where it is of sufficiently high quality to warrant special packing by count as well as by grade—packages holding

one, two, or three dozen selected apples, pears, or peaches, be adopted. These packages can be bought as 'nest' boxes. It is also recommended that selected large apples, pears or peaches be packed in single layers in flat baskets or boxes. These packages show fine fruit off to great advantage. The 1 lb. box for forced strawberries, and the 1 lb. punnet for strawberries, raspberries, cherries, dessert gooseberries and currants, are strongly recommended, the package being of nominal cost, and punnets non-returnable, and made up so that it gets a minimum of handling, and by its lightness always keeps fruit in best condition. One pound punnets should be packed in crates holding sixteen, twenty-four, or thirty-two each, the top layer of punnets being covered with a sheet of clean paper, and above that wood-wool. Where it is desired to pack choice selected fruits in less quantities than 5 lb. packages, the choice of package is left to the initiative of the grower.

“In regard to grapes and melons no absolute standard can be fixed for packages. It is recommended that strong, flat boxes with grapes in one layer be adopted, and that the finest wood-wool only be used for packing grapes, melons, and peaches.

“All packages should be of wood where possible, and be free and non-returnable. Where baskets are used they are returnable. All packages should bear such a label as the following:—

“(SAMPLE LABEL.)

PERISHABLE.—DELIVER AT ONCE.	
APPLES—GRADE A.	
From (Name),	_____
(Address),	_____
Sent (Date),	_____
_____ Boxes in	_____ Bundles.
To (Name),	_____
(Address),	_____
Per _____ Ry.	(State if Passenger or Goods.)

or, if boxes be branded, stating as follows:—

“The grower or Society’s name, address, and distinctive brand, if any.

“The kind of fruit contained.

“The grade—either A, meaning ‘Extra size’; B, meaning ‘First size’; C, meaning ‘Second size’; or D, meaning ‘Small size.’

“The sizes referred to are those named above in Section 2.

Section 4.—Standard Packages and the Fruits for which they are intended

“The standard of weight suggested is 5 lbs. The standard packages are multiples of the standard weight; thus, standard weights and standard packages will also assure to the buyers a reliable measure. These weights and measures are set forth below:—

"Standard Weights.				Standard Measures.
"(1)	5 lbs.,	taken as equivalent to		- 1 gallon.
"(2)	10	"	"	- $\frac{1}{4}$ bushel.
"(3)	15	"	"	- 3 gallons.
"(4)	20	"	"	- $\frac{1}{2}$ bushel.
"(5)	40	"	"	- 1 bushel.
"(6)	80	"	"	- 2 bushels.
"(7)	120	"	"	- 1 barrel.

"Apples and pears may be packed in all the above except gallons.

"Damsons and green gooseberries in all the above packages.

"Plums in all except 2-bushels and barrels.

"Cherries, red and amber gooseberries, in gallons, $\frac{1}{4}$ -bushels, 3-gallons, and $\frac{1}{2}$ -bushels.

"Strawberries, raspberries, currants and tomatoes in gallons and $\frac{1}{4}$ -bushels.

"We desire it to be distinctly understood that the foregoing proposals are *tentative* and *provisional*."

Following up this report the Committee have sent the Department specimen packages as follows:—

1. For general use.

Nest of six boxes, to hold 5, 10, 15, 20, 40 and 80 lbs., respectively.

2. For selected dessert apples.

Three nests of packages, each holding 1, 2, and 3 dozen, respectively. Each nest contains four boxes, one for each standard size of apple.

3. For selected cooking apples.

Three nests of boxes, each holding 1, 2, and 3 dozen, respectively. Each nest contains four boxes, one for each standard size of apple.

The illustrations below show the boxes recommended for general use in marketing fruit.

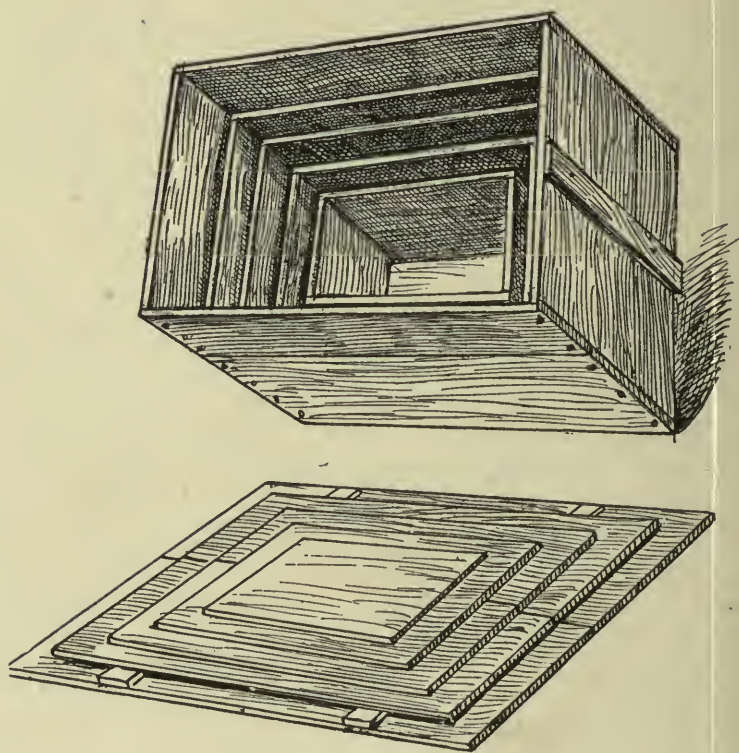
In p. 306 the lids have been removed, showing the boxes forming a "nest."

In p. 307 the boxes with lids on have been arranged to form a pyramid.

Special "nests" are manufactured for graded apples, both dessert and cooking.

These specimens were made by Messrs

George Perry and Co., Ltd., of Camden Row, Dublin, who have prepared a price list, which



they will supply on application. The manufacture of these packages, if they are adopted, will doubtless be speedily taken up by other firms in various parts of the country.



The Department would ask fruit growers to give the standard in fruit packing a careful trial. After some experience shall have been gained they will be glad to co-operate with fruit growers in considering further improvements and suggestions for the encouragement of this industry.

The benefit to producer and consumer generally, of a universal system of uniform weights, measures and packages non-return-
Confusion
of terms
able would be untold. That one miserable basket used in the Midlands and called "a pot" is most confusing and tiresome; as for instance a pot of apples is supposed to contain 64 lbs.; a pot of plums or damsons, 72 lbs.; of potatoes, 80 lbs.; beans or peas, 40 lbs.; onions, 70 lbs.; spinach and other greens, 20 lbs. I find in that useful annual "Farm and Home Year Book" a list of fruit and
Terms used
in different
counties
vegetable market measures, and in it an explanation of the following terms: bundle bunch, bushel basket, bushel sieve, flasket, flats, hand, junks, roll, sieve, half sieve, load

(this does not relate to a cart load, but is the name given to a basket which holds three bushels of beans), peck, punnet, pottle, pip, pots, tally. Here is "confusion worse confounded" to the novice!! Why must we continue this involved and intricate system, when the metric would give simplicity itself, after we were once accustomed to it? By way of parenthesis, at a Conference lately held in Worcester under the auspices of the Agricultural Organisation Society, one speaker in condemning the much abused "pot" quoted a story of a salesman making three fair-sized "pots" out of two, but of course only paying the grower for two. This slipshod system of dealing with fruit and other produce necessarily offers ample scope for abuse.

It is extraordinary what an amount of ^{Marketing} knowledge one picks up by hard practical ^{the produce} experience, but to the beginner the way is hard. In May 1900, at a meeting of the Lady Warwick Agricultural Association for

Women held in London, the subject of "Marketing the Produce" was discussed at some length, and an interesting article by Mr T. L. Green appeared in the *Woman's Agricultural Times* for the following July. I give these extracts because they are typical of the natural evolution of "marketing," which every novice appears to go through.

"It was suggested that the small producer of garden or orchard produce should not make the mistake of sending her commodities to such large markets as Covent Garden, Manchester, Birmingham, etc., but should create a special local market. The suggestion is a wise one, and though, in my experience, local markets are of somewhat limited application, it nevertheless deserves adoption to its fullest extent.

"Another suggestion was to take advantage of the parcels post. This, too, is all right if you can only succeed in obtaining your customers. To obtain them, one commonly advertises for them, stating at the

same time the articles one has to dispose of. I regard it as risky, and, in any case, expensive; whilst it is extremely easy to overdo this form of trade. Where one succeeds a dozen will fail.

“A third suggestion was, that the producer should secure friends to take regular supplies, and then to get them to give introductions to others. This, too, is all very well in a way; but experience proves it is a very unsatisfactory form of business. The less one has to do with one's friends in trading transactions the better. They will not always pay you the price you require and deserve; they will not always pay you promptly; and you will find, in time, that they will give you the maximum of trouble with the minimum of profit. They will, in many cases, gradually begin to ‘talk,’ you will eventually lose some—probably the whole—of their custom, and you will be worse off in every way than if you relied on the open market.

“These are somewhat negative criticisms,

but I am coming to a personal suggestion presently. To show, however, that these and some other remarks are really understood by the practical cultivator, reference need only be made to one very pertinacious and extremely sensible lady at Lady Warwick's meeting. This lady gave her disappointing experiences and repeatedly asked for suggestions other than those alluded to, which did not commend themselves to her practical mind. In turn, she herself suggested the formation of an association to assist those who had produce for disposal; this association apparently to consist of town and country members, the latter drawing up and supplying lists (with prices) of the goods they have for sale, and the former purchasing these same goods. The idea is at least novel, and it was a practical contribution to an interesting discussion.

“ My own view, however, of the marketing problem is rather different from that of any of the speakers. I am entirely in accord

THE MARKETING OF PRODUCE 313

with the notion of avoiding the wholesale markets in the large centres of population, unless a 'Stand' in one or more such markets can be obtained by someone who directly and honestly represents the producer; and even then I regard the experiment as risky and likely to lead to boycotting and under-selling by the other wholesalers in the same market. But the only real way to reap adequate returns is by the producers selling their goods retail in the various centres. For this purpose I believe London to be the best all-round place at which to make a start. It would be necessary to hire a shop, and to place in it a suitable staff. The shop need not be over large, but every care should be taken to fix on a good town or suburban district. The staff required would be in proportion to the trade expected, or acquired. At first it would be small. A man should act as manager; there should be a boy or two to go out on morning rounds to acquire orders and to deliver the goods; and there

should be a female in the shop to do such work as is constantly done by women—taking the cash, booking orders from lady callers, weighing up and arranging the lighter goods, helping to keep the place tidy, etc., etc. The man's work would mainly consist in buying, on the wholesale markets, *such goods as the producers themselves could not supply*, and, as much would depend on this individual's honesty in buying, his wages should be so arranged as in part to depend on the satisfactory results he is able to show. The rent of a good suburban shop would probably be about £50 to £60 per annum; the total wages of a couple of strong boys or youths would be (at the most), £80 to £100 (one boy would be sufficient at first); the manager could be obtained for another £100 a year, plus a commission of $2\frac{1}{2}\%$ to 5% on the turnover; and the female assistant should preferably be the wife of the manager, both of whom should live on the premises. In return for her assistance in the shop, the

pair should be allowed to live rent free. A pony and cart would complete the really necessary staff.

“There is nothing visionary about a proposition of this kind, and I hope it may lead to some further discussion. What is involved is a system of co-operation amongst the producers. There, I may say, I should be much surprised if ladies did not show that they could co-operate for the purposes of sale much better than men. The proposition also, of course, involves the expense indicated; but, in return, it places the producers *on a business basis*, and it rests with themselves to make it the success which is being constantly achieved by the individual small retail shopkeeper all over the country. This man has *to buy* everything. If he succeeds, why should not an association of determined women succeed who would *themselves grow a large part of the things they sell?*

“Is it possible for a number of ladies to

form such an association? It would be a grand feather in their 'cap' to do so. That they could achieve financial success, I personally have no doubt."

The inevitable conclusion arrived at by personal experience, and also from the related experience of people and students I have known, is that *retail marketing* is considered eminently unsatisfactory. The actual prices received may be higher, but against that has to be placed the time spent in packing small orders, in delivering, in booking, in collecting the money, in bad debts, in keeping the accounts, not to speak of cost of baskets and packages, and loss of these by depreciation and waste. Whereas if an honest and reliable Commission Agent can be found at a suitable market to sell the produce, he sends his own boxes or baskets which are exactly suited to goods to be sent: a dozen or more of these are despatched from the nearest station. In a few days you receive "a return," notifying the quantity and price

Wholesale
marketing

THE MARKETING OF PRODUCE 317

of goods, with the commission and railway freight deducted in separate sums, and on a regular day once a week the cheque for the week's sales. This means simplification of labour, as the flowers or fruit are picked and packed direct, a note of contents taken, and the whole despatched from the spot on which they are grown. Of course this is only possible when the supply is large enough and regular enough to follow out this routine.

Here then is the opportunity for co-operation. Let a certain number of producers combine and market their stuff co-operatively a regular supply can be assured, and a minimum of expense for carriage, etc., secured.

At the Conference at Worcester (to which allusion has already been made) the working of co-operative societies was touched upon at some length, and later on the points were summarised in the *W. A. T.*¹ The following

¹ *Woman's Agric. Times.*

extracts may be useful for the consideration of those interested in the question.

“That a co-operative society should be so carefully organised that it should be impossible for it at any time to degenerate into a limited liability company.

Co-operative
Societies

“That a co-operative society must have its sources of supply in good working order before trying to find a market for the same. That the *supply* must be *regular*, and the *quality* of the *highest*.

“That a co-operative society, to be successful, must have a good manager well paid, and, if possible, a canvasser or agent, who could both follow up the goods and trace the reasons which caused dissatisfaction to customers, and also watch the markets, and advise the society as to sales, etc. That the goods must be well graded and properly packed.

“That co-operative societies should combine to bring into force a uniform system of weights and measures, as the present system

of different weights obtaining in different counties led to fraud and confusion all round.

“That motor waggons were by far the best means of transport, and that as they were so expensive they should be owned co-operatively.”

In November of last year 1902 the Board of Agriculture published a most interesting report on the “Dutch Brined Vegetable Industry.”¹ As the result of a deputation to the Board, from the Biggleswade Trades and Agricultural Association, as to the serious effects of the Dutch competition on the brined vegetable industry in the country, Mr R. F. Crawford was instructed to visit the Netherlands and inquire into the matter, hence the report which is written with a freshness and absence of officialism which makes the pamphlet almost light reading. There is a chapter (p. 20) devoted to “Co-operation amongst Dutch Market Gardeners,” from

Dutch Brined
Vegetable
Industry

Co-operative
Market
Garden
Societies
in the
Netherlands

¹ Report on the Dutch Brined Vegetable Industry, Eyre and Spottiswoode, 8d.

which, reluctant as I always feel to have to admit that the foreigner shows a superior mind, I think much could be learned by us. Therefore I give it in full without apologies.

CO-OPERATION AMONG DUTCH MARKET
GARDENERS

An interesting feature of the Dutch Market Gardening industry is the great extent to which co-operative principles have been applied to the sale of vegetables and fruit. All over North Holland, the small market gardeners have formed societies for the joint sale of their produce, and in some districts they have erected their own auction marts. One of the largest of these Associations is that known as the "Westland."

The Westland is a district a few miles from the Hague, which is given up almost entirely to fruit-growing and market-gardening. The usual size of the holdings is about 5 acres, though a few run to 10 acres and upwards. Rents are high, averaging about £5, 10s. per

acre, and when there are glass houses erected by the owner, the gardener pays 5 to 8 per cent. yearly on the cost of erection.

A short description of a market garden of 10 acres visited at Poeldijk may serve as an example of the conditions existing in the Westland. In this case the occupier pays £5, 17s. per acre rent, and he has ten glass houses on his holding for which he pays 5 to 7 per cent. on the cost of erection.

These glass houses cost 50s. to 58s. per 39 inches to build, or when built against a wall, as is frequently the case, from 33s. to 40s. per 39 inches.

There is "a polder" tax of 13s. per acre on this holding, and the occupier also pays income tax. The soil is a clay loam, which the tenant has improved by the addition of sand brought from the dunes, and by heavily manuring it with horse dung.

On this holding large quantities of grapes, also melons, tomatoes, cucumbers, peas, beans, pears, plums, early cauliflowers, endive, and

strawberries are grown. The tenant works himself from early morning till night, and employs five labourers, to each of whom he pays 18s. a week. He keeps himself, a wife and five children on the profits from the sales of his produce, but his outgoings for rent, labour and manure are so heavy that the standard of living of the family is necessarily a low one.

To men in this position it is important that their produce should be sold to the best advantage, and to secure this result it is recognised that the quality of the articles produced should be maintained at a high level, and that the middleman should be as far as possible eliminated.

It is with these objects in view that the Dutch market-gardeners have combined for the joint sale of their produce, through the agency of co-operative associations, of which the "Westland" society is one of the most successful.

The object of the "Westland" society,

THE MARKETING OF PRODUCE 323

as set forth in the printed rules, is to promote the sale of market-garden produce of the Westland by supervising the quality, quantity and packing of the produce; by holding auction sales; by exporting goods of first-rate quality to foreign markets in order to direct attention to the character of Westland market-garden produce; by improving the system of cultivation, and by taking any steps which will further the disposal of the crops.

The society has a registered trade mark in the form of a blue diagonal label, which each member is allowed to affix to the produce he brings to the auction, provided that the goods have been previously passed by the Committee, whose duty it is to see that they are properly packed; that the contents of the packages, bags or baskets agree with the weight stated on the label, and that the articles are sound and of good quality throughout.

The Westland society consists of a federa-

tion of seven branches, five of which have erected their own auction halls with borrowed capital, while in two cases the auctions are held in hired buildings. Sales are held every night in summer, three times a week in the late autumn, and once a week in winter. These sales are largely attended by dealers and commission agents from Rotterdam, Amsterdam and the Hague and Delft, who arrange for the transport of their purchases to these towns, either for local consumption or for export.

Members of the society bring their produce to the auction mart in barges, and arrange their goods on the stands. When a large consignment of potatoes or other vegetables is offered for sale the purchase is made by sample, in other cases, the dealer sees the entire lot of the article he buys.

Each lot of produce to be put up for auction is entered on a delivery note by the member concerned, and this note is

handed to the clerk, who subsequently passes it to the auctioneer.

All goods purchased at the auction must be paid for in cash; credit is seldom given. A purchaser is also required to leave a deposit to cover the value of the sacks, baskets or other packages.

The auctioneer is in each case the president of the branch society. He receives nothing for his services, as the post is considered one of honour. The only paid officer of the society is the clerk.

The funds of the society are derived from a yearly subscription of 1s. 8d. per member, and from a commission charged on the amount realised for the goods sold.

In the case of what are known as large auctions, which include large consignments of potatoes, Brussels sprouts, beans, peas, gooseberries and plums, purchased by sample, the commission is fixed at 1 per cent., and for small auctions or sales of small quantities of grapes, fruit, cucumbers and other pro-

duce, 2 per cent. of the sale price is deducted.

The sum realised by the sales is distributed at the end of each week amongst the members who have sent goods to the auctions, each receiving the amount for which his produce was sold less the commission mentioned above.

In 1901 the value of the market-garden produce sold through the agency of the auctions held by the seven branches of the "Westland" society amounted to £44,250.

Some of the branches of the "Westland" society have recently established trial grounds for experiments in the improvement of market-garden produce, and for the testing of various manures.

These experimental grounds are supported by a subsidy from the State, and grants in aid are also made by the local authorities. They are inspected regularly by the directors of the State horticultural schools, and are managed by a committee of market-gardeners elected by the society.

Associations of the type of the "Westland" society, though on a smaller scale, are to be found throughout the market-garden districts of North Holland. Several of them are in operation in the districts of Alkmaar and Bovenkarspel, and the greater part of the cauliflower and cabbage crops grown in the neighbourhood of these places is disposed of by co-operative auction sales in buildings erected by such societies. The principal object of them all is to sell the produce of their members to the best advantage, and to maintain the reputation of Dutch produce for uniformity of quality by the inspection and marking of goods offered for sale. Unsuitable produce is either rejected, or, if it is inadvertently passed by the examining committee and a well-founded complaint is subsequently made by the purchaser, the producer is either compelled to take the goods back or to allow compensation to the purchaser on a scale fixed by the society.

In the case of one co-operative auction

mart near Bovenkarspel, a black board headed "Black List" is placed in a conspicuous position outside the mart, and on this the president of the society writes the name of any member who has endeavoured to pass inferior produce, and the name of any dealer who is in default in his payments.

Specimens of the rules of these associations are given in the appendix. It is claimed for this system of co-operation that it has largely reduced the commission and charges formerly paid to middlemen, that it has served to keep up the standard of quality of Dutch produce, and that it has prevented the under-cutting of prices which arises when individual producers compete against each other in the same market. Goods sold under the registered trade-marks have an established reputation on home and foreign markets, and the enforcement of a high standard of quality by the marking committees has made it difficult for an individual to spoil the market for his fellow

gardeners by "topping up" inferior produce or by giving short weight.

The village halls where the local auctions are held are a novel feature, and might be worthy of a careful consideration in organising small holdings or co-operative settlements. The absence of water for the transit of barges might have the effect of adding to the expense of marketing, but probably motor transport will very shortly solve this vexed question effectually.

Village halls
as auction
marts

In conclusion one may affirm with assurance that better times are coming for the intensive farmer, be he man or woman; the signs point to a very definite awakening; to a desire for co-operation, for system, for organisation, and to a determination to get out of the land more value, more satisfaction generally. With brains and fixity of purpose, there appears to be absolutely *no* reason why the "Lighter Branches of Agriculture" should not be profitable and advantageous from every point of view.

WOMEN'S AGRICULTURAL
SETTLEMENTS

CHAPTER VI

WOMEN'S AGRICULTURAL SETTLEMENTS

IN the preceding sections the work which women can do, and the possibilities of livelihood, have been discussed at considerable length, and now in conclusion it is but right and proper that the question of housing our agricultural sisters should occupy our thoughts. They must live close to, or amidst their work; and it is certain therefore that cottages will have to be built for them, since already in the country these are all too few for the present population, and many of the existing ones hardly deserve the name of a living place. The housing question

When the Lady Warwick Agricultural Scheme for Women was first initiated, this Agricultural Scheme for Women

important point was realised, and a Scheme of Agricultural Settlements was outlined, as the logical sequence of the Training at what was originally called her College, for those students who did not marry, or who had not homes to which to return, or who might desire otherwise.

As the main principles appear to be suitable for adoption now, five years later, I give the plan in full, and criticise what strikes me as unnecessary.

“It is proposed to establish Women’s Agricultural Settlements in different parts of the country, within easy distance of a certain market; *e.g.*, either:—

“1. The large manufacturing towns in the Midlands.

“2. Near a railway station in direct communication with London.

A Women’s Agricultural Settlement shall consist of a certain number of holdings or cottages (from six or ten to twenty), standing in a certain specified amount of ground (from

one to four acres), in a district not extending over too large an area.

“Each cottage or holding shall be occupied by two Women Settlers, either as partners (in which case the holding will be held jointly), or as ‘head’ and ‘subordinate’ (in which case the head woman will be responsible for the rent and work done).

“A Lady Superintendent will have the control of each Settlement, as far as the business arrangements are concerned, though each settler will have complete individual freedom.

“The Superintendent will be duly qualified as having a knowledge of horticulture or dairy work, and special capabilities for organisation, as she will advise the settlers on the production of their gardens, and make all business arrangements for the marketing of produce.

“Women will be eligible who can show practical experience of gardening, or of dairy work, or who hold certificates from

the Royal Horticultural Society, or from the Technical Instruction Classes, given under the County Councils in Horticulture, Dairy Work, Beekeeping, etc. (and students from the Agricultural Training College). They must also possess incomes of from £20 to £50 a year. The partnership of two women thus circumstanced will enable them to live healthy lives on the cheap holdings, and add gradually to their incomes, though it is not likely that fortunes will be made.

“The settlers will be expected to cultivate the ground attached to their holdings in some of the following ways: Flower, fruit and vegetable farming; bee and poultry keeping; bottling fruit, jam-making; home-made wines; or dairy work, with butter and soft cheese making, etc.

“The district must determine the nature of the produce.

“When Dairy Work is carried on, the butter and cheese will be made in a co-operative creamery.

“In each Settlement there will be a Factory, Creamery, or Central Office and Club Room, under the control of a Lady Superintendent, where the work of the Settlement will be done by co-operation. In fact the co-operative principle will underlie the whole scheme.

“The produce will be conveyed to the market or station regularly by the Settlement cart.

“There will be a Central Office in London to direct and control the business arrangements of the Settlement and College, and the whole will be under a Committee of Management.”

The Lady Superintendent savours too much of autocracy, too little of co-operation! Besides, I hardly know where such an official could be found. Five years of the closest work amongst women brings me to the melancholy conclusion that organisers amongst women are almost as rare as *true* saints, which Mr Churton Collins told us were only to be found one in a million. It may be that the

Lady Super-
intendent

next generations may produce them, but the present one seems to shrink hopelessly at anything savouring of responsibility, and as to directing others, the women of to-day would rather not attempt it under any circumstances. Nothing but a special training in tact and infinite patience will give the power to do this without getting all the Settlers "by the ears." Therefore let us embrace co-operation by all means, let the Settlers have an equal start, but let each work out her "own salvation": in time the natural lines on which a Settlement can be run successfully will present themselves, and doubtless the woman who possesses the greatest energy and grasp and creativeness will be the accepted, if not the accredited, leader—the President of the little Republic.

A co-operative
creamery

A co-operative creamery may be desirable after the Settlement has been well established, but at first one would suggest doing without it, and the Factory and Central Offices both

in London and on the Settlements. A small A club house Club run on very simple lines, with perhaps a restaurant and certainly a tea-room, would commend itself as a useful and non-expensive adjunct, and one which the requirements of the present time seems to demand. Under capable management it ought to pay well, and this would be a splendid way to learn business on purely co-operative lines, as a small society might be formed to run it, and shares issued. Then it would be to the interest of all Settlers who were shareholders to support it and make it pay. If the locality were favourable for retail custom, produce could be sold at the Club and orders taken.

To go into further details would be unwise, as there is no precedent for these Settlements, and it always seems a pity to tie up new schemes with rules and regulations and red tape. When once it has been proved that the principle of the thing is right, it is wisest (one would say) to let the details work

themselves out on their own natural lines, always supposing that the "Man at the Helm," who, at any rate, is morally responsible, is keeping a fixed and steady look out, not only on his own ship, but also on those who pass or overtake him, believing that he can always learn from others, and that his range can never be too wide and liberal if he would carry his ship safe to port.

Women's
settlements
ridiculed

The idea of Women's Settlements has been greatly ridiculed, as being contrary to the regulations which govern society. This of course must be conceded, but since the "surplus million of women" must be considered and provided for, surely the Settlements offer inducements and possibilities of a useful life leading to a definite end, which does not exist at present in many schemes for the Betterment of Women. Above all we want business, *not* philanthropy, and women to be taught and helped to maintain themselves in the station of life in which they are born, instead of sinking into

degradation and misery which is, alas! the unwritten history of not a few.

One word in conclusion. I have tried to show in the foregoing pages the possibilities of a healthy, happy life—which exists for women in Outdoor Work, and I have given practical experience and facts to prove my arguments. Perhaps I may be permitted to add that now, after five years of the closest experience in this branch of work to the “trained capacity,” I am more than ever convinced of its soundness and its infinite possibilities. This would lead me at all times to advocate it strenuously as a career for those who have any love for the country and for country life.

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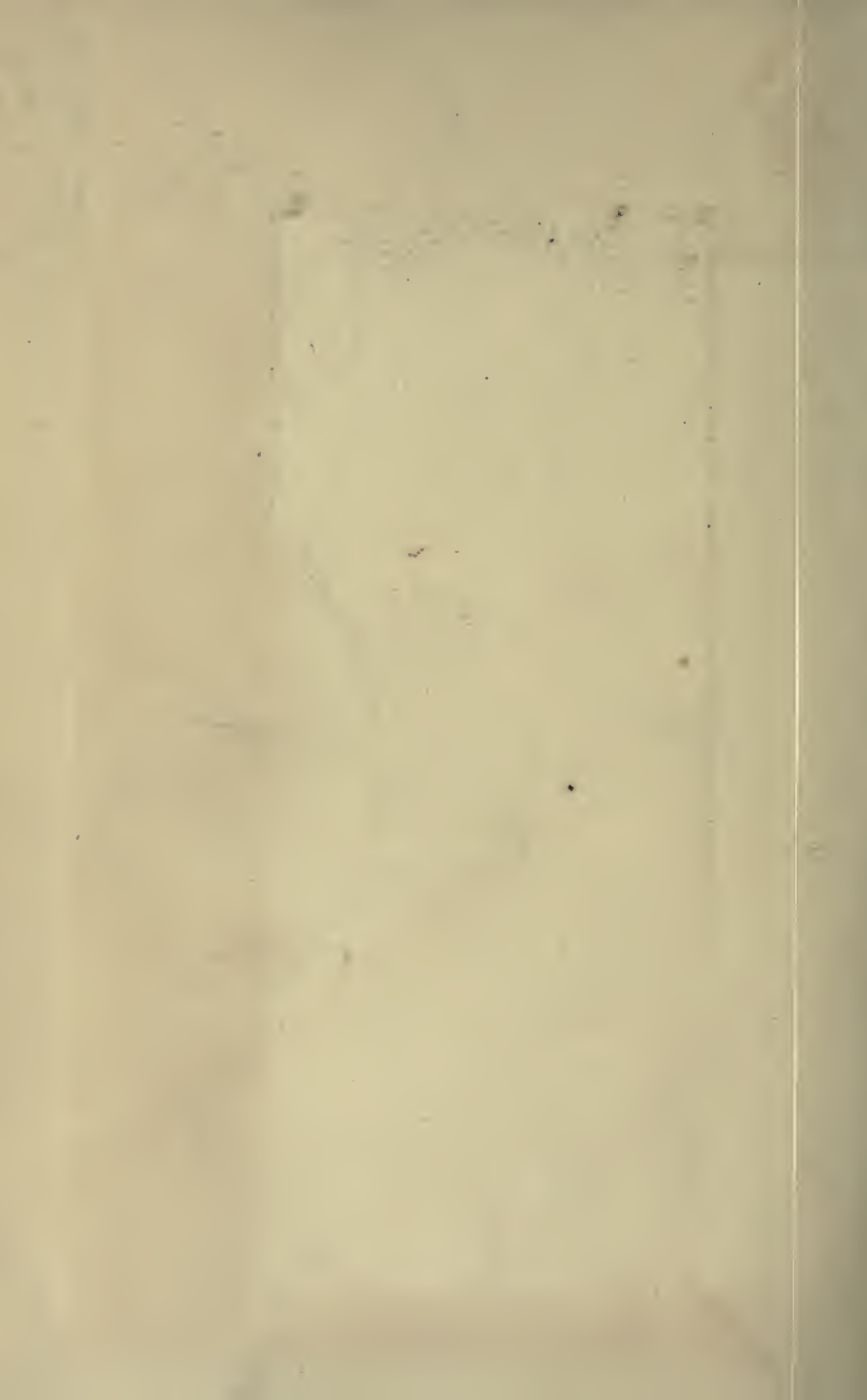
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